S. Hrg. 100-452

ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987

HEARINGS

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON

S. 1217

TO AMEND THE MINERAL LEASING ACT OF 1920 TO AUTHORIZE THE SECRETARY OF THE INTERIOR TO LEASE, IN AN EXPEDITIOUS AND ENVIRONMENTALLY SOUND MANNER, THE PUBLIC LANDS WITHIN THE COASTAL PLAIN OF THE NORTH SLOPE OF ALASKA FOR OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION

OCTOBER 13, 14, 15, AND 22, 1987

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ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987

TUESDAY, OCTOBER 13, 1987

U.S. Senate,
Committee on Energy and Natural Resources,
Washington, DC.

The committee met, pursuant to notice, at 9:50 a.m. in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The Chairman. Today the committee will begin consideration of legislative proposals dealing with oil and gas leasing in the Arctic National Wildlife Refuge in Alaska.

These hearings follow five oversight hearings conducted by the committee this summer on the Secretary of the Interior's report on oil and gas leasing in ANWR and on the general proposition: "Should ANWR be open for oil and gas leasing, exploration, and development?"

The legislation currently pending before the committee is S. 1217, a bill introduced by Senators Murkowski and Stevens, who authorize and direct the Secretary of the Interior to expeditiously open ANWR to oil and gas activities in an environmentally sound manner.

Today we will hear from the Department of the Interior, EPA, the State of Alaska, regarding this legislation. Tomorrow representatives of the petroleum industry and other groups supporting S. 1217 will appear before the committee. On Thursday, representatives of several conservation groups and individuals opposed to this legislation will appear before the committee.

Let me say at the outset, I am aware that there are many who do not want ANWR opened under any circumstances or under any terms or conditions. I also know that there are many who want ANWR opened now and believe that without any further regulation by the Congress, the area can be explored and oil and gas developed without significant environmental impact.

I am willing to stipulate that both sides of this proposition can provide hundreds of witnesses, who could spend hundreds of hours debating the question before the committee of should ANWR be opened.

I believe that, based on the committee's hearing so far, the hearings that are being held in the House, the committee's trip this summer, and the intense lobbying efforts by both sides, each member of the committee probably has most of the information necessary to make that basic decision.

In an effort to explore some new territory over the next three days, I have asked that each witness make specific comments relative to the legislative proposal currently pending before us and to provide the committee with specific and constructive suggestions about how a leasing program in ANWR should work if Congress decides to open this area.

During the next three days, I want to explore what kinds of stipulations, rules, regulations, mitigation measures, et cetera, would be necessary and desirable should we decide to open ANWR.

Regardless of what the committee ultimately decides about leasing in ANWR, this kind of information is essential to our deliberations and I expect the cooperation of all witnesses in making that record.

Each witness should submit his written statement for the record and summarize the main points in as brief a manner as possible. That will give us time for questions and discussions.

As you all know, we have submitted to the members of the committee that basic question of, should we proceed with legislation in this Congress to provide for opening of ANWR under some terms and conditions. And the committee voted privately by a margin of over two to one to proceed.

No committee member is bound by that vote. That does not indicate that they will necessarily vote for any particular form of a bill. But it does as far as I am concerned indicate on behalf of the committee a desire to proceed forward and get expeditiously a bill which the committee will then vote on, and I would expect pass out of this committee.

So I feel bound by a strong two to one majority on the committee to proceed and proceed expeditiously. What we wish to do in these hearings is to get to the information from which to make decisions.

The great argument about should we proceed under any circumstances has in effect at least tentatively been decided by this committee. The committee says yes, under proper circumstances we should proceed. And for that reason, I hope we can narrow the focus of these hearings to determine under what circumstances we should proceed.

And I would like to call on my esteemed ranking minority member, Senator McClure.

[The text of S. 1217 follows:]

II

100TH CONGRESS
1ST SESSION

S. 1217

To amend the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the public lands within the Coastal Plain of the North Slope of Alaska for oil and gas exploration, development, and production.

IN THE SENATE OF THE UNITED STATES

MAY 15 (legislative day, MAY 13), 1987

Mr. MURKOWSKI (for himself and Mr. STEVENS) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To amend the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the public lands within the Coastal Plain of the North Slope of Alaska for oil and gas exploration, development, and production.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Arctic Coastal Plain Public Lands Leasing Act of 1987".

CONGRESSIONAL FINDINGS

SEC. 2. As the basis for the declaration of policy and authorizations set forth in subsequent provisions of this Act, the Congress finds that—

(a) the Nation's domestic crude oil production is in substantial decline and dependence upon unreliable foreign sources of oil is growing at an alarming rate;

(b) production from the Prudhoe Bay oil fields on Alaska's North Slope, which now constitutes over 20 per centum of the Nation's total domestic crude oil production, will begin to decline rapidly in 1988;

(c) in 1980, Congress directed the Secretary of the Interior to study the oil and gas potential and the fish and wildlife resources of the 1.5 million acres of public land in the Coastal Plain;

(d) reports prepared by the Department of the Interior and other Federal, State, and private groups clearly indicate that the public lands within the Coastal Plain constitute the most outstanding oil and gas prospect in the United States, onshore or offshore, with potential reserves in place estimated to be from 4.8 to 29.4 billion barrels of crude oil;

(e) the results of eighteen years of operations at Prudhoe Bay provide compelling evidence that carefully planned and executed oil and gas exploration, development, production, and transportation on the public lands is compatible with the North Slope's fish and wildlife resources and the needs of subsistence users of those resources; and

(f) the long, ten or more years, lead time required for development of one or more major new North Slope oil fields requires a prompt decision by Congress on the future use of the public lands within the Coastal Plain.

DECLARATION OF POLICY

SEC. 3. (a) The Congress declares that it is in the national interest of the United States to:

(1) permit exploration, development, production, and transportation of the oil and gas resources within the public lands of the Coastal Plain, which is—

(A) located to the east of Prudhoe Bay, an area where intensive oil exploration, development and production has been conducted in an environmentally sound manner, and

(B) served by an existing crude oil pipeline and tanker transportation system;

(2) authorize an exploration and development program for the oil and gas resources of the public lands of the Coastal Plain which has the support of the State of Alaska, the North Slope Borough, the Village of Kaktovik, and other local governments in Alaska, and

the Inupiat Eskimo people of the North Slope, and which will serve the vital interests of the Nation, including—

(A) national security, by providing dependable new sources of domestic oil production outside of the control and influence of the Organization of Petroleum Exporting Countries;

(B) the interests of American consumers, by expanding domestic sources of reasonably priced gasoline, diesel, jet fuel, heating oil, and other crude oil products; and

(C) the national economy, by improving the balance of trade through reductions in foreign oil imports, by generating new economic activity, by creating new jobs, and by reducing the Federal deficit through increased tax, competitive bonus bid and royalty revenues.

(b) The Congress hereby declares that it is the policy of the United States that—

(1) exploration, development, production, and transportation of the oil and gas resources of the public lands within the Coastal Plain, the Nation's foremost prospect for the discovery of new giant and super giant oil fields, should be authorized and should proceed with dispatch; and

(2) such activities should be conducted in a manner consistent with the protection of the fish and wildlife resources and environment and the needs of the area's subsistence users which utilize the public lands of the Coastal Plain.

COASTAL PLAIN

SEC. 4. The Mineral Lands Leasing Act of 1920, 41 Stat. 437, as amended, is further amended by adding a new subchapter X at the end of chapter 3A—Leases and Prospecting Permits (30 U.S.C. 181) to read as follows:

"SUBCHAPTER X—COASTAL PLAIN LEASING

"AUTHORIZATION FOR LEASING OF THE COASTAL PLAIN

"SEC. 288. (a)(1) The Congress hereby authorizes and directs the Secretary of the Interior through whatever agency of the Department he deems appropriate Federal officers and agencies to take such actions as are necessary to establish and promptly implement a competitive oil and gas leasing program that will assure the expeditious exploration, development and production of the oil and gas resources of the public lands of the Coastal Plain.

"(2) This authorization includes, incorporates and supplements the provisions of the Mineral Leasing Act of 1920 and other existing Federal laws on oil and gas leasing, exploration and development on public lands, and grants such new legislative authority as is necessary to enable the Secretary to authorize and permit all such activities as are required to achieve the expeditious exploration, development and production of the oil and gas resources within the public lands of the Coastal Plain. These authorizations include all activities associated with and required in the exploration, development, production and transportation of the oil and gas resources of the public lands within the Coastal Plain, and include, but are not limited to, the authorization and granting of rights-of-way, permits, leases, use permits and such other authorizations as are necessary to facilitate exploration, development, production and transportation of oil and gas resources on the public lands within the Coastal Plain.

"(3) The Coastal Plain leasing program required by subsection (a) shall include the following elements:

"(A) The first lease sale shall be conducted within twelve months of the date of enactment of this Act.

"(B) The Secretary is authorized to grant to the highest responsible qualified bidder or bidders by competitive bidding, under regulations promulgated in advance, oil and gas leases on unleased public lands within the Coastal Plain. Such regulations may provide for the deposit of cash bids in an interest-bearing account until the Secretary announces his decision on whether to accept the bids, with the interest earned thereon to be paid to the Treasury as to bids that are accepted and to the unsuccessful bidders as to bids that are rejected. The bidding shall be conducted as determined by the Secretary pursuant to bidding systems included in section 205(A)(1) (A) through (H) of the Outer Continental Shelf Lands Act, as amended, of 1978 (43 U.S.C. 1331).

"(C) An oil and gas lease issued pursuant to this Act for public lands within the Coastal Plain shall be for a lease tract consisting of a compact area and not exceeding more than two thousand five hundred and sixty acres, as the Secretary may in his discretion determine.

"(D) Each lease shall be issued for an initial period of up to ten years and shall be extended for so long thereafter as oil and gas is produced in paying quantities from the lease or unit area to which the lease is committed or as drilling or reworking operations as approved by the Secretary are conducted thereon.

"(E) In the conduct of competitive lease sales under the authority provided by this Act, the Secretary shall seek to maximize the revenue paid to the Treasury, but in doing so shall make reasonable efforts to conduct lease sales in a manner which will enable independent oil and gas producers, acting alone or in combination with other independent producers, to have a competitive opportunity to successfully bid on leases granted under the authority of this Act.

"(4) This Act shall be considered the primary land management authorization for all activities associated with exploration, development and production of oil and gas on public lands within the Coastal Plain. No land management review shall be required except as specifically authorized by this Act.

"(5) Activities undertaken pursuant to this section shall include or provide for such conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable significant adverse effects on fish and wildlife and their habitat pursuant to subsection 288(b) of this Act.

"(6) The Secretary is authorized to permit, subject to reasonable rules and regulations, on public lands within the Coastal Plain all activities described in subsection 288(a) which are conducted by the owners of private lands within and/or adjacent to the public lands within the Coastal Plain.

"(7) All receipts from sales, rentals, bonuses, and royalties on leases issued pursuant to this Act shall be deposited into the Treasury and allocated in accordance with applicable law.

"OTHER LEASING PROVISIONS AND CONSIDERATIONS

"(b)(1) Prior to conducting a competitive oil and gas lease sale pursuant to section 288(a), the Secretary shall promulgate such stipulations, rules, and regulations as he determines are necessary and appropriate to ensure that oil and gas exploration, development, production, and transportation activities undertaken in the public lands within the Coastal Plain are conducted in a manner to achieve the reasonable protection of the fish and wildlife resources, environment and subsistence users which utilize the public lands within the Coastal Plain.

"(2) The "Coastal Plain Resource Assessment" (April 1987) prepared by the Secretary pursuant to section 1002(h) of the Alaska National Interest Lands Conservation Act of 1980 (Public Law 96-487) and the legislative environmental impact statement incorporated into the Coastal Plain Resource Assessment pursuant to the National Environmental Policy Act of 1969 (Public Law 91-190) shall satisfy all legal requirements under those laws with respect to any action taken to develop rules and regulations and procedures for a competitive oil and gas leasing program or to conduct particular lease sales on the public lands within the Coastal Plain. No further studies, reports, or assessments shall be required before the Secretary or other appropriate Federal officials may take such action.

"(3) Nothing in this Act shall be construed to affect the applicability of the National Environmental Protection Act of 1969 to phases of oil and gas development, production, and transportation conducted subsequent to initial leasing and exploration. Consistent with the general authority of the Secretary as described in subsection 288(a) of this Act, all Federal and State environmental laws of general applicability to oil and gas operations and permitting shall continue to be applied.

"IMPACT AID

"(c) The Secretary, after consulting with the Governor of Alaska and the North Slope Borough Assembly and Mayor, is authorized and directed to provide such impact aid, planning advice, and other appropriate assistance to communities on the North Slope and elsewhere in Alaska as is required to ensure the availability of public services needed to accommodate oil and gas exploration, development, production, and transportation on the public lands within the Coastal Plain.

"TRANSPORTATION ALTERNATIVES FOR CANADA'S BEAUFORT SEA AND MCKENZIE DELTA DISCOVERIES

"(d) The Secretary of State is authorized and encouraged to initiate discussions with the Canadian Government to determine whether it would serve the environmental and economic interests of the United States and Canada to explore the feasibility of engaging in mutual planning for the future development and transportation of the crude oil and natural gas resources previously discovered or projected to exist in the Arctic region under the respective jurisdiction of each country, both on shore and offshore. The subject matter of such discussions may include, but is not limited to, the exchange of environmental, fish and wildlife, and oil and gas related information; joint planning; the development of privately owned joint facilities for transport of crude oil or natural gas; the development of contingency plans to deal with any anticipated or associated environmental risks or problems; and the proposal of private Canadian companies for the transport of crude oil in tankers from offshore discoveries in Canadian waters along the Arctic coast line of the State of Alaska to a point west of Barrow, Alaska for transhipment to larger tankers.

"DEFINITIONS

"(e) For purposes of this Section—

"(1) The term 'Secretary' means the Secretary of the Interior; and

"(2) The term 'Coastal Plain' means those public lands identified in section 1002(b)(1) of the Alaska National Interest Lands Conservation Act of 1980 (Public Law 96–487).".

STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

Senator McCLURE. Thank you very much, Mr. Chairman. I thank you for your leadership in getting us to this point. I think it is fair to say the committee's reaction to your inquiry was partly the result of your own leadership in trying to move this issue forward.

Mr. Chairman, there are basically two questions before us today. One is, can this nation, with its will, technology, and concern, explore, produce, and transport oil from the coastal plain area of the Arctic National Wildlife Refuge in Alaska in a way that has the minimum effect on the wilderness character of the plain?

I am firmly convinced the answer to that question is an unequivocal yes. The same question was raised with respect to Prudhoe Bay development during the early 1970's. Our experience there has shown that we are equal to the task. As one indicator, the caribou herd at Prudhoe Bay has increased dramatically since that time, possibly in part due to the development of the Prudhoe infrastructure.

We have learned many lessons in conducting development activities in a fragile arctic environment, and improvements are being made constantly.

A second question is, do we need to open up ANWR for our energy needs? Again, I am convinced the answer is yes. While the world is generally in better economic condition today than it was in 1973 and 1979, we are rapidly approaching the position where we again will have free world vulnerability to the economic effects of a marginal shortage of an essential commodity.

Critics of leasing at ANWR add that the administration is ignoring other possibilities, such as developing alternative fuels, and that we are going into the wildlife refuge when we could save equivalent amounts of oil as believed to be at ANWR, simply by driving more slowly and making our appliances more efficient.

A balanced energy policy is absolutely essential, and that does mean conservation and it does mean alternative fuels. But it also means we must pursue domestic production opportunities.

We also hear critics say: Do not drill that oil; burn our coal. But other critics point out we have an acid rain problem and a whole host of other problems, real or perceived, associated with the burning of our plentiful coal resources.

Coal is and shall remain an integral part of our energy future, but we should not automatically assume that, since we are the OPEC of coal, we can automatically shift to the combustion of coal.

We have had an active alternative energy policy in this country, and I want to stress that we have had such a program. I have for the record the amount we have spent over the years 1978 through 1987 for alternative energy sources from the following programs: conservation R&D, multi-state distributions, including the Warner amendment, the Exxon agreement, et cetera, clean coal, coal R&D, gas R&D, oil R&D, solar and renewable, nuclear R&D, nuclear space and defense, and magnetic fusion.

The total in those programs is $1,595,721,000 in 1987. The high in those programs is $4,702,088,000 in 1986. I submit a number of charts to show our commitment to alternative energy sources, because they tell the story.

Mr. Chairman, I am absolutely convinced we need to develop the Arctic National Wildlife Refuge for domestic energy security reasons. But I am equally convinced we can do so in a reasonable, responsible, deliberate and environmentally sound manner. Wildlife and environmental resources can and must be preserved at the same time development occurs. I do not believe that any one of us would want it any other way.

Mr. Chairman, I look forward to working with you in reaching a responsible solution to the development of ANWR, and I appreciate these hearings. I would urge that we maintain a schedule in the committee that leads to a wise decision to achieve the balance of these national objectives at the earliest time possible.

Mr. Chairman, I ask unanimous consent that the charts that are attached to my statement be made a part of the record at this point.

The CHAIRMAN. Without objection.

[The charts follow:]

ALTERNATIVE ENERGY SOURCES

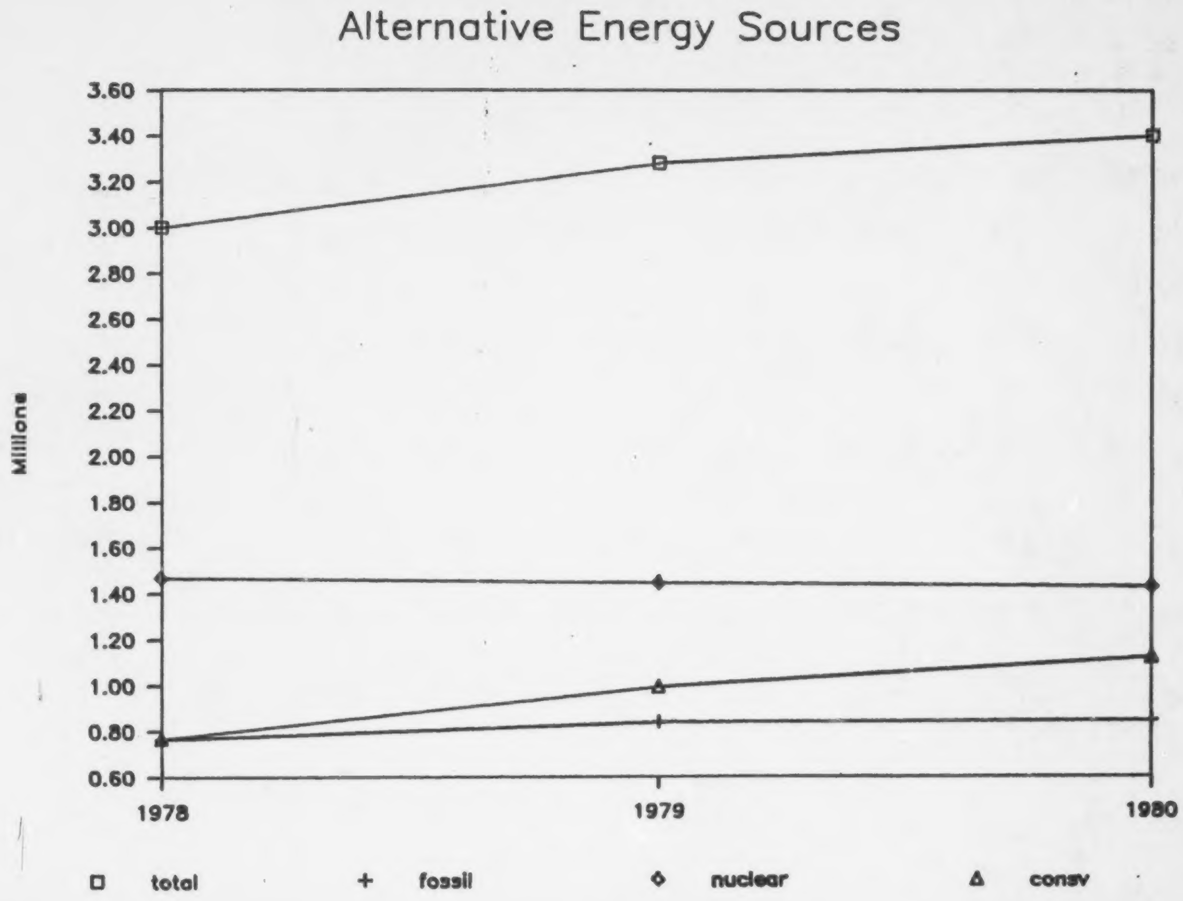
(Dollars in Thousands)

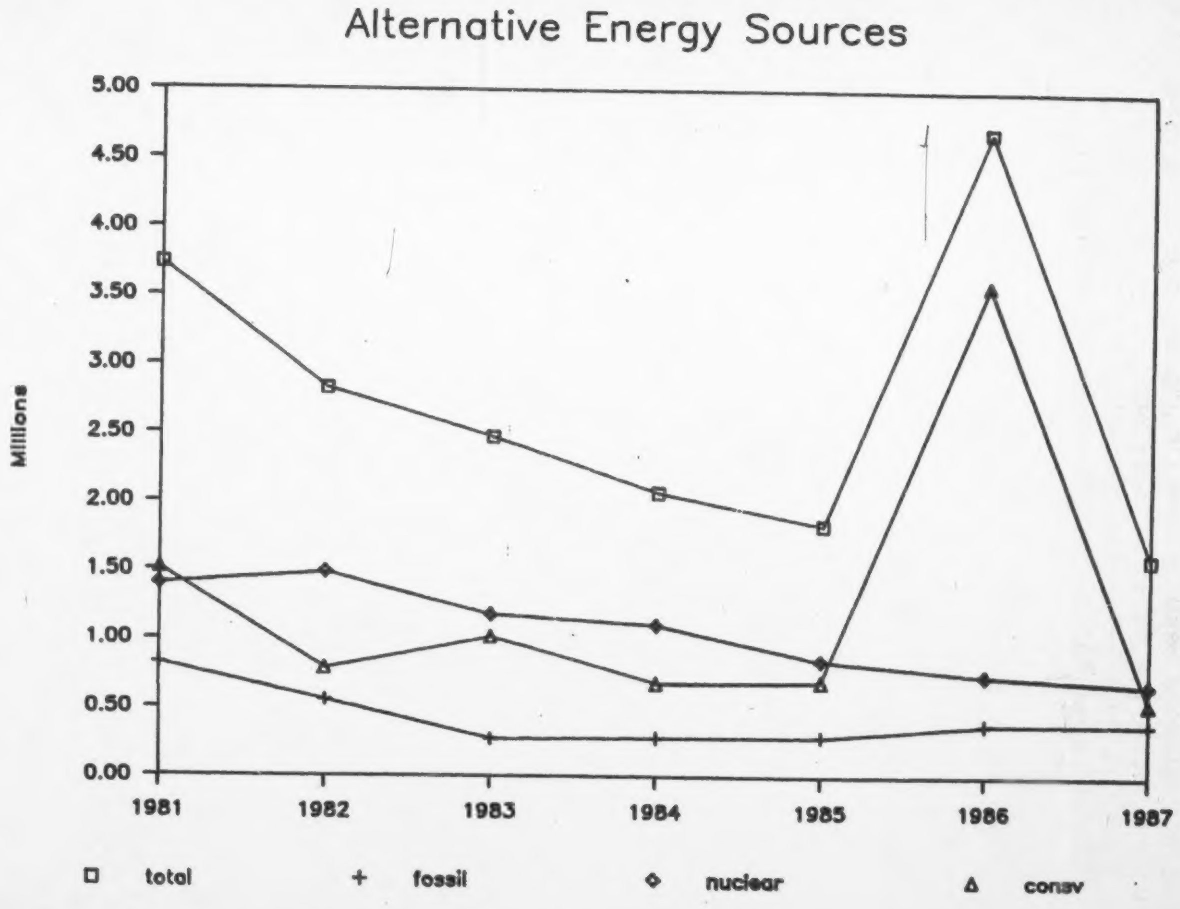
Alternative Energy Source	FY 1978	FY 1979	FY 1980
Conservation R&D	$ 165,380	$ 228,718	$ 294,872
Multi-State Distribution:			
Warner Amendment			
Exxon Agreement			
Others			
Clean Coal			
Coal R&D	659,315	703,941	754,898
Gas R&D	27,401	33,811	30,742
Oil R&D	78,617	100,854	61,713
Solar and Renewable	604,858	769,815	832,718
Nuclear:			
Research and Development	1,133,620	1,092,295	1,081,135
Space and Defense			
Magnetic Fusion	332,434	355,140	350,310
Total	$3,001,625	$3,284,574	$3,406,388

ALTERNATIVE ENERGY SOURCES

(Dollars in Thousands)

Alternative Energy Source	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1987
Conservation R&D	$ 292,456	$ 151,930	$134,689	$150,125	$175,536	$ 173,505	$160,447
Multi-State Distribution:							
Warner Amendment	—	—	200,000	—	—	—	—
Exxon Agreement	—	—	—	—	—	2,098,000	—
Others (Stripper Well Settlement, etc.)						853,500	—
Direct Appropriations	402,258	234,240	383,660	280,166	283,400	262,562	213,500
Clean Coal	—	—	—	—	—	98,176	147,261
Coal R&D	729,713	501,964	234,500	239,249	250,679	246,015	203,217
Gas R&D	31,013	11,712	13,680	15,400	10,142	8,503	8,009
Oil R&D	57,791	39,360	23,750	30,200	31,694	29,113	25,963
Solar and Renewable	822,943	400,928	304,065	255,799	240,091	198,969	171,194
Nuclear:							
Research and Development	1,005,740	1,033,330	721,782	632,999	412,612	352,050	277,158
Space and Defense						20,215	47,580
Magnetic Fusion	394,117	451,231	458,379	468,412	429,553	361,480	341,392
Total	$3,736,031	$2,824,695	$2,474,495	$2,072,350	$1,833,707	$4,702,088	$1,595,721


Alternative Energy Sources
Millions
3.60
3.40
3.20
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
1978
1979
1980
□ total
+ fossil
◇ nuclear
△ consv


Alternative Energy Sources
Millions
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
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1981
1982
1983
1984
1985
1986
1987
□ total
+ fossil
◇ nuclear
△ consv

Senator McClure. I ask unanimous consent that a statement by the distinguished Senator from Oregon, Senator Mark Hatfield, be made a part of the record at this point.

The Chairman. Yes, without objection.

[The prepared statement of Senator Hatfield follows:]

Senator Mark O. Hatfield
Statement
Committee on Energy and Natural Resources
October 13, 1987

Mr. Chairman, I thank you for holding these hearings so soon after the Committee decided to proceed to a decision on the ANWR issue. You have set an ambitious timeline for the Committee and it is my hope that we can meet it. I must stress at the outset, however, that my mind is not yet made up on whether we should open ANWR. Accordingly, I appreciate your holding these hearings now.

As members of the Committee know, I long have been involved in efforts to make this country energy independent. The Committee was very active during the oil crises of the 1970s in developing policies which allowed us to reduce our dependence on foreign oil. However, we have seen these efforts reversed during this Administration, and I see no indication that policy will be changed in the next fifteen months.

With the decline in oil production on the North Slope expected to begin early in the next decade, I am concerned how we will deal with less domestic production. The oil reserves geologists believe to be under the 1002 area would help reduce our dependence on oil imports by as much as 9 billion barrels, but so would an increase in conservation and R&D for renewable energy sources. The choices with which we are faced are not as simple as whether to develop ANWR or to leave the 1002 area as wilderness. Therefore, the Committee must take its policy-making responsibilities seriously and look at all available options.

During the course of these hearings I will be listening carefully to see what options are available to us. I hope Members and witnesses will see the necessity for the Committee to examine more than the narrow range of options we have been presented thus far.

The CHAIRMAN. Senator Ford.

Senator FORD. I have no statement, Mr. Chairman. Thank you.

The CHAIRMAN. Senator Murkowski.

STATEMENT OF HON. FRANK H. MURKOWSKI, A U.S. SENATOR FROM THE STATE OF ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman.

First of all, I want to thank you for scheduling these hearings today. I think that the manner in which you have proceeded under the four oversight hearings that we have had and the debate, while somewhat unusual, has been most enlightening to us all.

We are holding these hearings today, tomorrow, and Thursday, and authorizing the reauthorization of oil and gas leasing in the coastal plain. And of course, this issue is very important, not only to my state of Alaska, but to the national security of our nation as well.

We have had an opportunity to have many of our members tour Alaska, and as a consequence of that I feel that the straw poll taken by the committee two to one in favor of going ahead and considering legislation in this session, in the balance of our current session, is not only appropriate, but I think reflects the commitment that this committee has in the area of oil and gas legislation and to identify certainly the most promising area, and that is the ANWR.

In the past, Mr. Chairman, the main concern, the environmental objection, seemed to dwell on the question of the caribou herd. As a consequence of the migration this year and the realities of the winter season, most of the caribou appear to have calved outside of the particular 1002 area.

That is significant in itself, but the environmental concern has simply moved to another objective, and that is a concern over the ecosystem and the suggestion that millions of acres would be developed if leasing occurs. Well, as we know, that is not necessarily the case.

There are some 19 million acres in ANWR and less than eight percent, about 1.5 million acres of the coastal plain, is the area proposed for leasing. The amount of land that would be actually impacted, of course, would be far less than that.

In fact, if the entire 1002 area were to be developed, which of course is not likely, the footprint on the coastal plain would be less than one-tenth of 1 percent of the area. It is my understanding that pro formas have been developed on various drilling proposals, and one scenario suggests that, with today's technology, as much as 500 million barrels of oil can be produced from only two drill pads in the lease area, impacting only 120 acres.

I think one also has to consider as we deliberate on this legislation the reality that Alaska contains 56 million acres of wilderness set aside in perpetuity. So one has to reflect on the balance, what is practical and what is impractical, and the question of just how much is enough.

As we all know, Prudhoe Bay's oil production currently is somewhere in excess of 22, 23, close to 25 percent of the domestic oil produced in the United States today and the reality that in 10 to 20 years that field will be almost depleted in its entirety.

As a consequence of our increased dependence on imported oil, the question comes to mind quite quickly, where are we going to find another domestic alternative? What we are talking about here, Mr. Chairman, is putting up the area for lease to determine if in fact there are recoverable reserves that are capable of development.

Make no mistake about it, if you are lucky enough to find oil in Alaska, that is not good enough. You better find a lot of oil.

One thing about the wilderness, Mr. Chairman, I think deserves a reflection. One of the comments of one of the members who visited ANWR, who got out of the helicopter and looked around and he asked the question, where is the wilderness?

Now that may sound trite, but I think it represents the reality that the wilderness is a perception. That particular individual looked at the area and assumed it was an arctic desert, and that is another perception.

So as we reflect on the realities that make decisions, I think we should keep in perspective the fact that we have dealt quite successfully in the Prudhoe Bay area. We have learned from the Prudhoe Bay experience. We have advanced technology that can be applicable in ANWR if indeed we are fortunate enough to find oil.

And I would request of my colleagues consideration on the obligation and the national security of this Nation that we have an adequate inventory of our resources. It makes little sense to have the strategic petroleum reserve and supplies of various strategic minerals if indeed we do not know whether we have a sufficient discovery of oil in ANWR as is estimated in the sense of being one of the highest and most likely areas left in North America.

What we have today, Mr. Chairman, is Senate bill 1217. Senator Stevens and I introduced this bill last May as a vehicle to authorize oil and gas leasings in the promising onshore area and gas prospects considered to be in North America within ANWR.

Our bill, S. 1217, is a straightforward directive to the Secretary of the Interior to conduct simple oil and gas lease sales on the coastal plain of ANWR. I hold no illusions that this committee's final product will closely resemble the initial bill. Nonetheless, I believe that it is an appropriate place to start for the committee in its legislative deliberations.

As we proceed for the next 3 days, I hope that we will receive contructive advice on ways to make this legislation better. Following the hearings, I believe it would be wise to proceed with a markup as soon as possible.

I leave you with one other thought, Mr. Chairman, and that is the reality that we have some 30 to 40 ships in the Persian Gulf, some 15,000 American service personnel that are prepared to die if necessary to maintain the flow of oil in the Persian Gulf.

I think that sends the message to this committee that it is indeed our responsibility to move ahead and inventory our domestic reserves to determine indeed whether we are going to continue to have to depend increasingly on foreign imports or whether we have an alternative. And that alternative I think is in the legislation that we are beginning today with this hearing.

So again, Mr. Chairman, thank you for the commitment of time and energy of the professional staff, as well as my colleagues and their staff as we address this energy issue that's of such importance, not only to my State but the entire United States and our national security.

The CHAIRMAN. Thank you, Senator Murkowski.

Senator Hecht.

STATEMENT OF HON. CHIC HECHT, A U.S. SENATOR FROM THE STATE OF NEVADA

Senator HECHT. Thank you, Mr. Chairman. And I too thank you for having these hearings. Senator Murkowski has done a wonderful job talking for this bill. I think you have convinced a lot of us on the committee. I certainly am convinced we have got to move ahead and, like you said, we have got to move ahead very, very swiftly.

I am glad you are taking the lead, the initiative, and I am sure you will work out the right way to proceed.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Hecht.

Our first witness we would like to welcome, Assistant Secretary for Fish and Wildlife and Parks, William P. Horn, accompanied by——

Mr. HORN. Mr. Cason, Deputy Assistant Secretary for Land and Minerals Management.

The CHAIRMAN. Very good. Welcome, Secretary Horn. We are glad to have you back here at the committee along with Mr. Cason.

STATEMENT OF WILLIAM P. HORN, ASSISTANT SECRETARY FOR FISH AND WILDLIFE AND PARKS, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY JAMES E. CASON, DEPUTY ASSISTANT SECRETARY FOR LAND AND MINERALS MANAGEMENT

Mr. HORN. Mr. Chairman, thank you. I appreciate the opportunity to appear here before the committee today on behalf of Secretary Hodel.

I would like to express our sincere and deep appreciation to the committee for your prompt consideration of this issue. Such quick action is important because it is the judgment of our Department's geologists that the 1002 area of ANWR is the single best opportunity in the country to significantly increase our oil production and add to our diminishing reserve base in the future.

Moving on to the specifics rather quickly, the Secretary's recommendation section of the 1002 report outlined the principles which in our judgment ought to be contained in any ANWR opening legislation. We strongly support the intent of S. 1217 because it embodies many of these principles.

We recommend, however, several adjustments to the leasing program contemplated by that bill. Notwithstanding those recommendations, we strongly endorse the approach contained in that measure of providing authority for both exploration and production.

It has been suggested by some that Congress should authorize an exploration only program or a two-phased program requiring additional congressional or other decisions before permitting development of any discovered oil resources after the conclusion of an exploration program.

We believe these kind of approaches would be extraordinarily costly to the taxpayer and ultimately unworkable. History suggests that government agencies do not conduct an efficient and timely exploration program. Government agencies are simply not oriented towards large, high risk programs of this nature.

We must remember that, even in areas where oil is ultimately discovered, that many dry holes are usually drilled before deposits are found. And one of the best examples we can cite is that it took 10 wells to discover the very large structure that has produced the 9 billion barrels of reserves of Prudhoe Bay.

The odds are against any drilling effort making an early strike on a major deposit, even in a highly promising area like the 1002. As is indicated, the Government just is not organized to engage in these high risk activities.

In contrast, the entire structure of the oil industry is organized towards risk taking, and the existence of many companies participating in a leasing program ensures a wide range of prospects and geologic concepts are likely to be pursued by the private sector.

I would also point out that such an exploration-only approach would deprive us of significant revenues that could reasonably be expected to accrue from bonus bidding on leases allowing exploration and production of any discovered reserves.

We are persuaded that it is not unreasonable to expect receipts in the range of $2 billion to $4 billion from lease sales, and that is in terms of immediate up front bonus moneys, dollars generated, even if no oil is subsequently discovered.

However, if a Government drilling program does not find oil in a tract, the lease and bonus values of that tract and potentially neighboring tracts could plummet. We believe the disadvantages that would accompany an exploratory program would not justify transferring the risk accompanying the search for oil and gas from the oil companies to the American taxpayers or foregoing bonus royalties or revenues of this magnitude which would accrue to the Federal treasury whether or not oil is actually found.

Therefore, we strongly urge the committee to adopt the full leasing and development approach contained in S. 1217. We believe that that, coupled with the provisions assuring appropriate environmental protection, provide the best approach for this area.

Moving on to some of the suggested alterations in S. 1217 first we would recommend that Congress enact the stand-alone authority for oil and gas activities on the coastal plain, rather than add provisions to the Mineral Leasing Act of 1920 or the OCS Lands Act.

Such a measure should authorize the Secretary to pursue an orderly program for leasing the entire 1002 area. Because of the environmental and energy considerations unique to this area, we believe it is also important that Congress provide guidance expressly tailored to the area. Any legislation should carefully be crafted to achieve the dual goals of expeditious exploration and development of the oil and gas resources of the area and protection of its important fish and wildlife resources.

We stand ready to assist the committee in drafting legislation of this type. Along these lines, we recommend that this new statutory authority include a clear standard for protection of the fish and wildlife of the coastal plain and associated habitat.

After much internal review, we put forth a standard in the 1002 report, which was of "no unnecessary adverse effects." In developing that standard, we have defined unnecessary adverse effects to mean "those impacts likely to cause harm to fish and wildlife, their habitats or the environment, that can be reasonably avoided by the application of appropriate technology and engineering procedures, timing, and siting."

With this standard and the type of mitigation stipulations outlined in the 1002 report, oil leasing and production can be accomplished consistent with the natural resources of the area.

I think it is also important that we note the interplay of this prospective legislation with the Refuge Administration Act that presently governs administration of the area. And here we have a simple recommendation: One, that if Congress chooses to open the 1002 area, that it designate and make oil and gas exploration and development one of the primary purposes for which the area will be managed.

Secondly, we would recommend that the Congress consider deeming activities related to oil and gas that are consistent with a no unnecessary adverse effects standard to be compatible with the purposes of the refuge.

I think that this would work to make the stand-alone leasing program mesh very nicely with the Refuge Administration Act and permit management of the refuge to proceed in an orderly fashion, and also permit us to proceed in an orderly fashion to lease and explore this area for its hydrocarbon potential.

Moving from the general to the specific, the 29 mitigation measures contained in the 1002 report are attached to my testimony, and they represent the types of specific actions we would apply to a leasing development program. I should note that they are basically a starting point, and we will develop and propose site specific, more detailed stipulations for various activities in accordance with the general principles that would be developed during the NEPA process for any leasing activity that we would pursue.

Now, the operational stipulations for the well drilled on the KIC Arctic Slope lands, which have been previously submitted to the committee, are more extensive and detailed and give the committee an idea of how we would work with the industry on an on the ground basis to apply stipulations to protect the environment.

To give you some examples attendant to the well drilled there on the KIC property, we made them put together an oil derrick that could be laid down during foggy periods, to not only provide for human safety but to ensure minimal collisions with flying waterfowl in the foggy conditions that often affect the area.

There is a caribou proximity stipulation added that during the drilling that went on, particularly as we got more towards the end of the winter, into the spring, whenever animals, particularly pregnant cows, came within an appropriate or relative proximity to the well, drilling activities had to cease.

Of course, it goes without saying that one of the stipulations we would pursue would be winter operations only in terms of exploration, and all of the drilling and all of the seismic work that has been conducted generally gets done between November 1st and May 1st, when the area is frozen solid. People operate on temporary ice fields and ice roads, with no damage to the tundra.

Now, some of the particular stipulations that we have outlined and I think are important to note give some idea of the commitment the Department would have to ensuring that the environment in this area is protected, and would include:

Stipulation number 11, no surface occupancy at the important Sadler-Rochet Spring;

Stipulation number 16, which is general use of time and space surface restrictions to keep people and human activity out of particular areas during caribou calving or snow geese staging, when we know the animals use a particular locale;

Stipulation number 18, to ensure the re-injection of drilling muds and drilling wastes, to avoid some of the problems attendant to the late steventies technology used in Prudhoe Bay;

Stipulation number 20, noise limits within two miles of rapter nests so we do not adversely affect nesting golden eagles or peregrine falcons;

Stipulation number 29, to ensure that rehabilitation and restoration plans are part of our permanent approval process. This is to make sure that the footprint of human activities on the tundra will be temporal, even if we are fortunate enough to discover oil in the area.

Now, one particular issue that has been of high concern has been related to gravel and water availability. As indicated by Senator Murkowski in his opening comments, the area can be classified as an Arctic desert, and so there has been some concern about will there be sufficient water available to permit activities to proceed in a safe fashion.

Related to that, of course, is where do we extract the gravel? There is ample gravel reserves on the 1002 area, but some of them are attendant to riparian zones and riverbeds, and there is concern about adverse impacts on fishery resources.

I direct your attention to recommended mitigation step number 5 in the 1002 report, which I quote:

> Point 5. Prohibit gravel removal from active stream channels and major fish-bearing rivers, winter water removal from fish-bearing waters or springs and tributaries feeding into fish-bearing waters, spring, summer, or fall water removal from fish-bearing waters to levels that will not easily pass fish or maintain quality rearing habitat.

We have been sensitive to this issue from the outset and would hope that any authority that is provided to lease the area would permit the Secretary to impose these types of restraints to ensure that the environment is duly protected.

In addition to the inclusion of our "no unnecessary adverse effects standard," we also recommend that the Secretary be given the authority to require no unnecessary duplication of surface facilities in the coastal plain and the Department be provided new stand-alone authority to subject requests for rights of way and facilities siting to the same "no unnecessary adverse effects standard."

This will ensure that the development scenario designed for the 1002 area is the most coordinated and efficient possible consistent with environmental protection. It will also ensure that the footprint on the tundra from these activities is minimized.

We also believe that new leasing authority must contain certain unique provisions relating to the mechanics of an ANWR program. First, we would expect to conduct lease sales on a sealed, cash bonus bid, fixed royalty basis. We note that S. 1217 provides the Secretary the authority to use any of the bidding systems listed in the OCS Lands Act, and we have no objection to the provision of this discretionary authority.

We would also ask for authority to lease tracts larger than the 640 acre limitation on competitive leases that we have in the lower 48. We agree with the provision in S. 1217 that sets this size at 2560 and would like additional authority to exceed that size up to a total of 3,840 acres in order to accommodate odd-shaped tracts along boundaries.

Also, the development and marketing of oil and gas from the 1002 area is dependent upon the development of a transportation system and infrastructure to link up with Prudhoe Bay and the Trans-Alaska Pipeline. Any leasing authority should contain provisions permitting the Secretary to suspend the term of a produceable lease in general, and particularly pending construction of the necessary means for transporting the oil to market.

S. 1217 also adopts the final legislative EIS that was incorporated in the 1002 report as the necessary NEPA compliance for the development and conduct of lease sales, and requires such sales to take place within 12 months of enactment.

We have recommended and believe that the final legislative EIS should be adopted as the programmatic environmental impact statement for the leasing program. But we have committed and propose to comply with NEPA for each subsequent step of the process, be it leasing, exploration, or approval of production plans.

However, such NEPA compliance will require approximately 18 to 24 months after passage of authorizing legislation before the first lease sale could occur if there are no legal challenges further delaying matters. Accordingly, we would not be able to comply with the twelve month deadline contained in this legislation.

In order to prevent delays beyond the 18 to 24 months, we recommend that expedited judicial review provisions similar to those included in the Trans-Alaska Pipeline Authorization Act of 1973 be included or considered by the committee.

Lastly, we read the provisions of section 4 of the bill, S. 1217, as potentially limiting the applicability of Federal and state environmental laws. The Secretary has consistently stated that all applicable Federal laws should apply to leasing activities on the coastal plain.

Moreover, suspension of state laws would be contrary to the basic approach of this administration regarding Federal-State relations. We do not anticipate any problems working with the State of Alaska in this particular area.

Mr. Chairman, that concludes our comments on S. 1217. We look forward to working with you and the committee on this measure and would be pleased to answer any questions you all may have.

[The prepared statement of Mr. Horn follows:]

TESTIMONY OF WILLIAM P. HORN, ASSISTANT SECRETARY FOR FISH AND WILDLIFE AND PARKS, DEPARTMENT OF THE INTERIOR, AND JAMES E. CASON, DEPUTY ASSISTANT SECRETARY FOR LAND AND MINERALS MANAGEMENT, DEPARTMENT OF THE INTERIOR, BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, REGARDING S. 1217, OIL LEASING AT THE ARCTIC NATIONAL WILDLIFE REFUGE

October 13, 1987

Mr. Chairman, I am William P. Horn, Assistant Secretary for Fish and Wildlife and Parks of the Department of the Interior. With me today is James E. Cason, Deputy Assistant Secretary for Land and Minerals Management of the Department of the Interior.

On behalf of Secretary Hodel, I would like to express our appreciation to the Committee for your prompt consideration of this issue. We believe timely action by the Congress to permit oil and gas leasing on the Coastal Plain, with appropriate environmental protection measures, is essential. ANWR is our single best opportunity to increase significantly the Nation's oil production in the foreseeable future. As you know, this is a unique area. It has the potential for containing the largest undiscovered oil and gas reserves in the United States. The mean estimate of in-place resources for the Coastal Plain is 13.8 billion barrels of oil and 31.8 trillion cubic feet of gas. As we have previously testified, and as the Secretary's report explained in detail, we believe leasing can be accomplished consistent with the wildlife values of the refuge.

We strongly support the intent of S. 1217. While we would recommend several adjustments to the leasing program contemplated by the bill, we strongly endorse the approach contained in S. 1217 of providing authority for both exploration and production. Because of the high costs of conducting oil activities in the Arctic -- typically in the tens of millions of dollars -- there is no reason to expect that private interests would invest the resources needed for a full exploratory program on the Coastal Plain without assurances that they would be permitted to develop any discoveries that might be made.

It has been suggested that Congress should authorize an exploration-only program, or a two-phase program requiring additional decisions before permitting development of any discovered oil resources after the conclusion of an exploratory program. We believe these kinds of approaches would be extraordinarily costly to the taxpayer and ultimately unworkable. Furthermore, the alternative of a Federally-funded exploratory program would require substantial financial outlays -- we estimate a Federal exploratory drilling program could approach $1 billion, depending on the size of the program -- at a time when the Congress and the Administration are making major efforts to reduce expenditures.

History suggests that government agencies do not conduct an efficient and timely exploratory program. Government agencies are simply not oriented towards large, high-risk programs of this nature. We have a relatively small group of petroleum geologists, whose expertise is in resource assessment rather than in searching for oil. The basic structure of the Federal Government provides few, if any, rewards for risk-taking, and penalizes failure. We must remember that even in areas where oil is ultimately discovered, many dry holes are usually drilled before deposits are found. The odds are against any drilling effort making an early "strike" on a major deposit.
The oil companies, by comparison, have a relatively large number of personnel experienced at searching for oil. Their

entire structure is organized towards risk-taking. And the existence of many companies insures a wide range of prospects and geologic concepts are likely to be pursued.

Conversely, the nature of the governmental decision-making process is likely to provide a built-in bias towards early abandonment of a drilling program if there are not immediately positive results. For example, it is not difficult to visualize pressures from both the Administration and Congress for reduction or elimination of appropriations for such an expensive drilling program if early results are negative and the budget deficit continues to be a major problem. Failure or extensive delay in a government exploratory program could not only waste major amounts of taxpayer funds, but deprive the nation of the benefits that would result from a significant oil discovery should major deposits of oil in the coastal plain go undiscovered.

I would also point out that such an approach would deprive us of significant revenues that could reasonably be expected to accrue from bonus bidding on leases allowing exploration and production of any discovered reserves. I believe it is not unreasonable to expect receipts in the range of $2 billion - $4 billion from lease sales, even if no oil is discovered. However, if a government drilling program does not find oil in a tract, the lease and bonus value of that and possibly neighboring tracts plummet. We believe the disadvantages that would accompany an exploratory program would not justify transferring the risks accompanying the search for oil from the oil companies to the taxpayers, or forgoing bonus revenues of this magnitude, which accrue to the Federal Government whether or not oil is actually found.

Therefore, we strongly urge the Committee to adopt the full leasing approach of S. 1217. We believe that, coupled with provisions assuring appropriate environmental protection, this is the best approach for the area. We do, however, believe that S. 1217 can be improved.

First, we believe that the Congress should enact stand-alone authority for oil and gas activities on the coastal plain rather than add provisions to the Mineral Leasing Act of 1920 or the OCS Lands Act. As I mentioned above, this is an area of vast mineral potential and important wildlife values. It has been recognized by the Congress, in the Alaska National Interest Conservation Lands Act, as an area deserving special attention. Because of the environmental and energy considerations unique to ANWR, we believe it is important that Congress provide guidance expressly tailored to the area. Any opening legislation should be carefully crafted to achieve the dual goals of expeditious exploration and development of the oil and gas resources of the coastal plain and protection of its fish and wildlife resources. We stand ready to assist the Committee in drafting this kind of opening legislation.

Along these lines, we recommend that this new authority include a clear standard for protection of the fish and wildlife of the Coastal Plain, and their habitat. We read S. 1217 as establishing two possibly conflicting standards. Section 4 requires the Secretary to insure that oil and gas activities are conducted so as "to achieve the reasonable protection" of fish and wildlife and other resources, and to mitigate "reasonably foreseeable significant adverse effects" on those resources.

We believe that the best standard is that proposed by the Secretary in the 1002 report, that of "no unnecessary adverse effects." In developing our 1002 report, we have defined unnecessary adverse effects to mean "those impacts likely to cause harm to fish and wildlife, their habitats, or the environment that can be reasonably be avoided by the application of appropriate technology and engineering procedures, timing, and siting." With this standard and the type of mitigation stipulations outlined in the Secretary's report, oil leasing and production can be accomplished consistent with the natural resources of the area.

The 29 mitigation measures contained in the 1002 report are attached to my testimony. It should be noted that these are generalized measures. We would propose site-specific, detailed stipulations for the various oil and gas related activities in accordance with these principles during the NEPA process for the leasing activity in question. The operational stipulations for the KIC/ASRC exchange contract, which has previously been submitted to the Committee, contain at great length more extensive and detailed, but still generic, environmental protection stipulations which we would propose to apply to any leasing activities on the Coastal Plain.

Because much has been made of possible conflicts over the use and availability of water and gravel, I would like to use these as examples of how the related mitigation measures can be used to avoid or minimize unnecessary adverse effects. We would consider prohibiting the removal of gravel from active stream channels on major fish-bearing rivers and requiring site-specific approval for any gravel removal activities. To protect water availability for fish and wildlife, we would monitor water levels and examine prohibiting winter water removal from fish-bearing waters, or from springs and tributaries feeding such waters, where appropriate. Furthermore, we would also look at prohibiting water removal at any time from fish-bearing waters if the result would be water levels that would not easily pass fish or that would damage breeding and rearing habitat.

There would be no surface occupancy in the Sadlerochit Spring special area to protect the aquatic habitat essential for fish overwintering.

We might permit gravel removal only on a site-specific approval basis within a specified distance of the high water mark on specified water courses to protect riparian habitats and water quality. Requirements for consolidation and no duplication of facilities will also reduce gravel and water needs.

We have also suggested in the report that off-stream reservoirs be created in conjunction with gravel extraction operations to promote additional water sources. Similar stipulations in the regulations used to govern the seismic exploration program on the Coastal Plain, and the Chevron drilling operations on the KIC/ASRC lands could also be utilized, including requirements for no significant alterations of banks of streams, rivers, or lakes, and no use of explosives within, beneath, on or in close proximity to fish-bearing waters.

We would also look at how operations could be conducted in a manner that does not unnecessarily impede the passage of fish, disrupt fish spawning, overwintering or nursery areas, or block, change, or cause significant siltation or pollution of streams, rivers, lakes and ponds. Of course, rehabilitation plans would be required.

In addition to inclusion of our "no unnecessary adverse effect" standard, we also recommend that the opening legislation give the Secretary authority to require no unnecessary duplication of facilities in the Coastal Plain and authority to subject requests for rights-of-way to the same environmental standard without regard to the access provisions of title XI of the Alaska National Interest Lands Conservation Act. This will assure that the development scenario designed for ANWR is the most coordinated and efficient possible consistent with environmental protection. It will also assure that the "footprint" on the tundra from these activities is minimized.

We also believe that this new authority must contain certain unique provisions relating to the mechanics of an ANWR leasing program. First, we would expect to conduct lease sales on a sealed cash bonus bid, fixed royalty, basis. This has been shown over years of experience to provide a fair return to the Federal taxpayer as well as efficient exploration, development and production. We note that S. 1217 gives the Secretary the authority to use any of the bidding systems listed on the OCSLA. We have no objection to this discretionary authority.

We also believe that we need authority to lease tracts larger than the 640-acre limitation on competitive leases that we have in the lower 48. We agree with the provision in S. 1217 that sets this size at 2,560 acres but would like additional authority to exceed that size up to a total of 3,840 acres in order to accommodate odd shaped tracts along boundaries.

Careful attention must be paid to how the rights of the Federal Government are protected vis-a-vis the rights of the lessees of the KIC/ASRC lands. This legislation would serve as opening legislation for those native-owned lands as well and as such must address issues of cooperation and environmental coordination that will arise when development begins on those lands.

Also, the development and marketing of oil and gas at ANWR is dependent upon the development of a transportation system and infrastructure which, except for the Trans-Alaska Pipeline, does not yet exist. Therefore, given the uncertainties of the Arctic environment, any leasing authority should contain provisions permitting the Secretary to suspend the term of a producible lease in general, and particularly pending construction of the necessary means for transporting the oil to market.

In addition, the bill adopts the Final LEIS accompanying the Secretary's report as the necessary NEPA compliance for the development and conduct of lease sales, and requires such a sale to take place within 12 months of enactment. In contrast, while we believe that the Final LEIS should be adopted as the programmatic Environmental Impact Statement for the leasing program, we propose to comply with NEPA for each subsequent step of the process -- leasing, exploration, and production.

Such NEPA compliance will require approximately 18 to 24 months of work after passage of authorizing legislation before the initial lease sale could occur if there are no legal challenges further delaying matters. Accordingly, we would not be able to comply with the 12-month deadline contained in the legislation. In order to prevent delays beyond the 18 to 24 months, we recommend that expedited judicial review provisions similar to those included in the Trans-Alaska Pipeline Authorization Act be included.

We read the provisions of section 4 as limiting the applicability of Federal and State environmental laws. The Secretary has consistently stated that all applicable Federal laws should apply to leasing activities on the Coastal Plain. Suspension of State laws would be contrary to the basic approach of this Administration to Federal-State relations. We do not anticipate any problems in working with the State of Alaska, and if serious concerns do arise we believe they could be resolved on a case-by-case basis by working with the Congress and the State government as needed.

Finally, there has been much discussion about how the revenues from ANWR should be distributed. We would like to use this opportunity to make the Committee aware that the Administration believes that, because the resources of ANWR belong to the nation as a whole, all Americans should share equitably in the values yielded from development of those resources. This being the case, the maximum possible amount of money from ANWR should go to the Treasury.

This concludes our comments on S. 1217. Let me assure you that we are available at any time to work with the Committee and its staff on this issue. Jim and I would be pleased to respond to any questions you may have.

The CHAIRMAN. Thank you very, very much, Secretary Horn.

S. 1217, of course, is a starting point. It is really just a matrix to give us a basis on which to discuss the issues. We may or may not approve it in full or in part. So we are obviously free to consider any changes, however slight or drastic, to that.

Now, in the process of conducting these hearings, I would like to get the issues isolated and narrowed as best we could. Now, would you help us in identifying those issues? For example, as I go through here there are some issues that come to mind.

One might be, should there be an exploration only phase? I personally am satisfied that there should not be. I think it is clear to me at least that that simply does not work, that either you have to put out too much money out of the Federal treasury, which we cannot get, or that—I just do not think that works.

I do not know whether any member of the committee would like further information on that particular issue, but that certainly would be an issue.

Secondly, the question of the core calving area, should there be one set aside? I know that the State of Alaska is interested in that.

There is this question of the standard for protection of fish and wildlife. You have discussed that in your statement, whether it should be to achieve reasonable protection to mitigate reasonably foreseeable significant adverse effects, or to simply have, as you suggest, no unnecessary adverse effects.

We will need to know whether that last phrase is a phrase that is contained in the law, whether it is a phrase of legal art, and precisely what it means, is it well understood.

Next would be the amount to lease, whether we should provide for leasing of the whole amount or phase in different areas or save some areas for leasing last. There are a whole raft of other issues.

Expedited judicial review you discussed in your statement; stipulations in the leases, what we should require in terms of legislation; right of way authorities and limits; how much should we write into the bill about disposal of waste, gravel—all of those issues which you discussed, use of water in the wintertime, water ponds, that whole raft of issues.

The question is, from the standpoint of this legislation what should be written in? We are not going to—I would not think we would want to write in everything legislatively, but that is something we ought to discuss here.

Special liability provisions is another.

Now, can you give us any help with additional issues that we should identify?

Mr. HORN. I think you have listed the primary ones. We could get into the discussion of lease mechanics, but I think the general approach we would prefer there would be to provide the Secretary with generic authority for an orderly program and then leave it at that.

However, different levels of detail could be incorporated in the legislation. Those would be the primary ones. I think the eight or nine that you have just listed out would be the ones that we have wrestled with in developing the report, and the ones that we obviously have been wrestling with since this debate was engaged in this spring.

I think generically the position the Department would take would be to have the Congress outline the basic objectives and the basic parameters and then essentially vest the discretion for dealing with the detailed nuts and bolts of the program within the Department, subject to appropriate review, and operate the program in that fashion.

So that in terms of stipulations, for example, give us the authority to impose them, but not have the statute, for example, pick up the 29 stipulations we have listed in the report, things of that nature.

The CHAIRMAN. By the way, I am asking staff to try to refine these questions after the hearing today and make those available to all parties, and we ask them to give any suggestions you may have to add issues. In other words, we want to try to have an issue stated more or less as a question or a proposition, so that we can get the response of the various witnesses to that.

I mean, I would like to know, for example, how does the Department feel about phased leasing. I want the environmental community to speak about that. You have already spoken about this expedited judicial review on the EIF.

We want to get the response of others on that particular issue.

Secretary Horn, we have introduced S. 735, as you know, which varies the proportion, the 90/10 proportion that goes to Alaska. And you had indicated you would give us a legal opinion on whether that was possible under the law, and I simply ask that you expedite the receipt of that or expedite the delivery of that to us. We need that.

Mr. HORN. I have checked with the solicitor and it is my understanding that it is nearly complete. We will be providing it to you very shortly.

[The information follows:]

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

NOV 4 1987

Honorable J. Bennett Johnston
Chairman, Committee on Energy
and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

In response to your request, I have enclosed the opinion of our Solicitor with respect to the division of receipts from any future oil and gas development of the Arctic National Wildlife Refuge. The Solicitor has concluded that the Alaska Statehood Act does not restrict the Congress to the distribution scheme of the Mineral Leasing Act when enacting legislation to provide for the allocation of revenues from new mineral leases in Federal wildlife refuges.

If we can be of any further assistance to you, please do not hesitate to contact us.

Sincerely,

J. Stephen Britt
Assistant to the Secretary for
Congressional and Legislative Affairs

Enclosure

United States Department of the Interior

OFFICE OF THE SOLICITOR
WASHINGTON, D.C. 20240

M-36957
CLC.SO.0001

NOV - 4 1987

Memorandum

To: Secretary

From: Solicitor

Subject: Division of Receipts from Oil and Gas Development from the Arctic National Wildlife Refuge

You have asked whether the Alaska Statehood Act (ASA), Pub. L. 85-508, 72 Stat. 339 (1958), in any way limits Congress' ability to enact a revenue distribution scheme for oil and gas revenues from new leases in federal wildlife refuges that is different from the revenue distribution scheme set out in the Mineral Leasing Act of 1920 (MLA), 30 U.S.C. § 181. Your question refers specifically to the Arctic National Wildlife Refuge (ANWR). The MLA formula provides for the distribution to Alaska (the State) of 90 percent of revenues received by the United States from oil and gas leasing on public lands within the State. For the reasons discussed below, we conclude that the ASA in no way restricts Congress to the distribution scheme set out in the MLA when it enacts legislation to provide for distribution of revenues from new mineral leases in federal wildlife refuges.

BACKGROUND

At issue is the authority of Congress to determine the distribution of revenues from oil and gas leases on public lands in Alaska, and, specifically, from lands that are part of the National Wildlife Refuge System. At present, a distinction is made between revenues from acquired lands and those from reserved public domain refuge lands. Federal oil and gas revenues from acquired lands within refuges are distributed according to a schedule set out in the Wildlife Refuge Revenue Sharing Act (WRRSA)[1] which allots 25 percent to the county in which the refuge is located and 75 percent to the Migratory Bird Conservation Fund, while federal revenues from reserved public domain lands within refuges are distributed in accordance with the Mineral Leasing Act,[2] which allots 50 percent to the states,

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[1] Section 401, 16 U.S.C. § 715s(c); Watt v. Alaska, 451 U.S. 259 (1981).

[2] Section 35, as amended, 30 U.S.C. § 191.

except Alaska, in which the refuge is located, 40 percent to the Reclamation Fund, and 10 percent to miscellaneous receipts in the U.S. Treasury. Alaska receives 90 percent of MLA lease revenues derived from within the State. The remaining 10 percent goes to miscellaneous receipts in the U.S. Treasury. As the refuge currently at issue, ANWR, is on reserved public domain land, we will focus on the provisions of the Mineral Leasing Act in analyzing the issue presented to us.

The distribution system set out in the Mineral Leasing Act was extended to Alaska in section 28(b) of the Alaska Statehood Act, as follows:

> (b) Section 35 of the Act entitled "An Act to promote the mining of coal, phosphate, oil, oil shale, gas and sodium on the public domain", approved February 25, 1920, as amended (30 U.S.C. 191), is hereby amended by inserting immediately before the colon preceding the first proviso thereof the following: ", and of those from Alaska 52 1/2 per centum thereof shall be paid to the State of Alaska for disposition by the legislature thereof".

After amendment, section 35 of the Mineral Leasing Act read as follows:

> All money received from sales, bonuses, royalties, and rentals of public lands under the provisions of sections 181-184, 185-188, 189-192, 193, 194, 201, 202-209, 211-214, 223, 224-226, 226d-229a, 241, 251, and 261-263 of this title shall be paid into the Treasury of the United States; 37 1/2 per centum thereof shall be paid by the Secretary of the Treasury as soon as practicable after December 31 and June 30 of each year to the State within the boundaries of which the leased lands or deposits are or were located; said moneys to be used by such State or subdivisions thereof for the construction and maintenance of public roads or for the support of public schools or other public educational institutions, as the legislature of the State may direct; and, excepting those from Alaska, 52 1/2 per centum thereof shall be paid into, reserved and appropriated, as part of the reclamation fund created by sections 372, 373, 381, 383, 391, 392, 411, 416, 419, 421, 431, 432, 434, 439, 461, 491, and 498 of Title 43, and of those from Alaska 52 1/2 per centum thereof shall be paid to the State of Alaska for disposition by the legislature thereof: Provided, That all moneys which may accrue to the United States under the provisions of sections 181-184, 185-188, 189-192, 193, 194, 201, 202-209, 211-214, 223, 224-226, 226d-229a, 241, 251, and 261-263 of this title from lands within the naval petroleum reserves shall be deposited

> in the Treasury as "miscellaneous receipts", as provided by section 524 of Title 34. All moneys received under the provisions of sections 181-184, 185-188, 189-192, 193, 194, 201, 202-209, 211-214, 223, 224-226, 226d-229a, 241, 251, and 261-263 of this title not otherwise disposed of by this section shall be credited to miscellaneous receipts. (Feb. 25, 1920, ch. 85, § 35, 41 Stat. 450; May 27, 1947, ch. 83, 61 Stat. 119; Aug. 3, 1950, ch. 527, 64 Stat. 402; July 10, 1957, Pub. L. 85-88, § 2, 71 Stat. 282; July 7, 1958, Pub. L. 85-508, §§ 6(k), 28(b), 72 Stat. 343, 351.)[3] (Emphasis added).

The United States Senate is presently considering a bill, S. 735, that would change the distribution system as applied to revenues derived from oil and gas leasing within units of the National Wildlife Refuge System. Specifically, the bill provides that 50 percent of such revenues would go to the state, 25 percent to the Land and Water Conservation Fund and 25 percent to the federal government. If the bill passes, it will apply to all leases in any wildlife refuge issued after enactment, but it is expected that the refuge most immediately affected will be ANWR.

In recent testimony on S. 735 before the Senate Energy and Natural Resources Subcommittee on Public Lands, National Parks and Forests, and in documents submitted to us in connection with our consideration of this issue, representatives of the State of Alaska have argued that Congress cannot legally enact a revenue distribution formula that provides Alaska less than 90 percent of mineral leasing revenues from the leasing of public lands in Alaska without the consent of the State.[4]

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[3] The net effect of the amendment was to accord Alaska both the 37 1/2 percent share enjoyed by all other states and the 52 1/2 percent that would otherwise have gone to the Reclamation Fund, for a total of 90 percent. A succession of subsequent amendments to section 35, most recently in section 104(a) of the Federal Oil and Gas Royalty Management Act, 30 U.S.C. § 1701, has changed these figures to 50 percent for states and 40 percent for the Reclamation Fund in states other than Alaska, and 90 percent for Alaska, to be distributed on a monthly basis.

[4] Alaska also raises a number of political and policy issues arising from the historic relationship between the federal government and the states and, specifically, between the federal government and the new state of Alaska. We do not purport to address those political and policy issues in this memorandum.

ANALYSIS

The enactment of legislation establishing a distribution formula for federal revenues obtained from the leasing of federally owned minerals falls within the power of Congress enumerated in the Property Clause of the Constitution:

> The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States. . . .

U.S. Constitution, art. IV, § 3, cl. 2.

The Mineral Leasing Act of 1920 is an example of the use of this power. Once having enacted such a system of mineral leasing, Congress has the authority under the Property Clause to change the distribution schedule set up with regard to the revenues resulting from those leases. As indicated in United States v. Locke, 471 U.S. 84, 104 (1985), "[t]he United States, as owner of the underlying fee title to the public domain, maintains broad powers over the terms and conditions upon which the public lands can be used, leased, and acquired." In the Locke case, the Supreme Court was called upon to determine the constitutionality of a legislative provision that subjected holders of unpatented mining claims to forfeiture of those claims if they failed to comply with the annual filing requirements of the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701. In holding the regulation to be constitutional, the Supreme Court indicated that "[c]laimants thus must take their mineral interests with the knowledge that the Government retains substantial regulatory power over those interests." [The Court compared this holding to Energy Resources Group, Inc. v. Kansas Power and Light Co., 459 U.S. 400 (1983), dealing with the impairment of contractual relations.] Id. at 105.[5]

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[5] The people of Alaska implicitly acknowledged the powers reserved to Congress under the Property Clause when they agreed in the Alaska State Constitution that:

> The State of Alaska and its people forever disclaim all right and title in or to any property belonging to the United States or subject to its disposition, and not granted or confirmed to the State or its political subdivisions, by or under the act admitting Alaska to the Union. The State and its people further disclaim all right or title in or to any property, including fishing rights, the right or title to which may be held by or for any Indian, Eskimo, or Aleut, or community thereof, as that right or title is defined in the act of admission. The State and its people agree that, unless

(footnote continued)

Against this background, Alaska must sustain a heavy burden to show that Congress lacks the authority under the Property Clause to change the distribution system for federal revenues derived from oil and gas leases on federal lands, including wildlife refuges.

Alaska's primary[6] argument against Congress' power to enact a

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> **otherwise provided by Congress, the property, as described in this section, shall remain subject to the absolute disposition of the United States. They further agree that no taxes will be imposed upon any such property, until otherwise provided by the Congress. This tax exemption shall not apply to property held by individuals in fee without restrictions on alienation.**

Alaska Constitution, art. 12, § 12.

[6] Alaska also argues that a change in the distribution, such as that proposed in S. 735, would result in the State being treated differently than other states. Specifically, Alaska argues that it is the only state that has a refuge producing oil and gas revenues on reserved lands and, therefore, is the only state that will be impacted by a provision changing the distribution formula for reserved wildlife refuges. Although this appears to be primarily a policy issue, Alaska does suggest that the equal footing doctrine may be implicated by such unequal treatment. However, after reviewing this matter, we do not believe that it raises substantial legal questions. Factually, the proposed law would apply to all new leases on all wildlife refuges. As a factual matter, it is not clear that it would have an unequal impact in the long run. As a legal matter, even if there were an unequal impact, this impact would not constitute a violation of the equal footing doctrine. In Nevada v. U.S., 512 F. Supp. 166 (D. Nev. 1981), a case in which the State of Nevada challenged a moratorium on the disposal of public lands under the equal footing doctrine, the court accurately summarized this doctrine as follows:

> Federal regulation which is otherwise valid is not a violation of the "equal footing" doctrine merely because its impact may differ between various states because of geographic or economic reasons. Island Airlines, Inc. v. CAB, 363 F. 2d 120 (9th Cir. 1966). The doctrine applies only to political rights and sovereignty; it does not cover economic matters, for there never has been equality among the states in that sense. U.S.

(footnote continued)

distribution formula for receipts from the lease of refuge minerals that is different from the formula set out in the MLA is that the MLA distribution scheme was incorporated into and made a part of the compact of statehood. According to that argument, the MLA was so incorporated by virtue of the inclusion in the Alaska Statehood Act of a section amending the MLA to apply it to Alaska. The State argues that Congress made the distribution formula part of the compact as a vehicle for granting Alaska a permanent property interest in mineral revenues from public lands.[7] According to this argument, as a grant made to the State in the compact of statehood, the property interest may not be changed. Thus the State argues that the distribution system comes within the narrow confines of Beecher v. Wetherby, 95 U.S. (5 Otto) 517 (1877), a case holding that a grant made in a statehood act is an "unalterable condition of the admission [of the State into the Union], binding upon the United States."

We do not dispute that a grant made in a statehood act may be unalterable. However, we believe that in this instance, Alaska paints too broadly the compact of statehood. Rather than being a grant incorporated into that compact, the distribution system

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> v. Texas, 339 U.S. 707 (1950). Said case points out that, when they entered the Union, some states contained large tracts of land belonging to the federal government, whereas others had none. 'The requirement of equal footing was designed not to wipe out these diversities but to create parity as respects political standing and sovereignty.' Id., at 716. Accordingly, Congress may cede property to one state without a corresponding cession to all states.... The equal footing doctrine does not affect Congress' power to dispose of federal property....

[7] In documents submitted to us, the State cites several instances in the legislative history of the ASA in which Members of Congress expressed an intent to provide Alaska with sufficient revenues to function as a state, and several other instances in which congressmen or reports cited the 90/10 distribution system. However, these expressions of intent do not answer the question of whether the 90/10 distribution was to be a permanent grant of a property interest and whether, by setting out such a formula in 1958, Congress sought to terminate its Property Clause powers with regard to federal mineral revenues from federal lands forever. Our analysis of the statutes and judicial precedent compel a negative answer to both questions that is not changed by the citation suggesting a general intention to provide the new state with revenue.

applied to Alaska in section 28(b) is nothing more than an exercise of Congress' powers under the Property Clause to dispose of and make needful rules for the public's property.

Judicial precedent instructs that not every provision in a statehood act is an irrevocable grant to the state. Thus, we must look carefully at the provisions of the ASA to ascertain what must be included within the terms of its statehood compact with the United States. The Supreme Court has had occasion to consider the different kinds of authority Congress may exercise in passing a statehood act and what provisions of a statehood act may properly be considered part of the compact entered into at statehood. In Coyle v. Oklahoma, 221 U.S. 559 (1911), the Court held that certain conditions contained in Oklahoma's statehood act were not part of the compact of statehood. The Supreme Court pointed out that in admitting a new state into the Union, Congress may simultaneously exercise other of its powers, such as the power to regulate commerce or the power "to make all needful rules and regulations respecting the territory or other property of the United States" (citing Pollard's Lessee v. Hagan, 3 How. 212 (1845)). The Supreme Court concluded that provisions contained in a statehood act that are enacted under one of these other powers, "cannot operate as a contract between the parties, but are binding as law." Coyle, at 571. The Court then went on to say:

> It may well happen that Congress should embrace in an enactment introducing a new state into the Union legislation intended as a regulation of commerce among the states, or with Indian tribes situated within the limits of such new state, or regulations touching the sole care and disposition of the public lands or reservations therein, which might be upheld as legislation within the sphere of the plain power of Congress. But in every such case such legislation would derive its force not from any agreement or compact with the proposed new state, nor by reason of its acceptance of such enactment as a term of admission, but solely because the power of Congress extended to the subject. . . .

Id. at 574.[8]

Section 28 of the ASA is just such an enactment. It is based on Congress' power under the Property Clause to administer federal property interests. The MLA itself was similarly based, and the amendment to it contained in the ASA cannot be used to alter its origins or elevate it to compact status so that it cannot be amended.

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[8] See also, Nevada v. U.S., 512 F. Supp. at 171-172: "Regulations dealing with the care and disposition of public lands within the boundaries of a new state may properly be embraced in its act of admission, as within the sphere of the plain power of Congress." (Citing, U.S. v. Sandoval, 231 U.S. 28 (1913).

Section 28 of the ASA, on its face, does not purport to be either a part of the compact between the United States and the State of Alaska or a permanent grant of mineral revenues to the State. In fact, section 28 did nothing more than amend a statute that had already been in existence for over 30 years before the ASA was enacted and had long been applied to federal lands in all other states.[9] Further, section 28 is but one of several sections added at the end of the ASA to amend existing law to apply it specifically to Alaska. Section 28(b) in particular was a necessary and timely expedient because Congress wanted to extend to and adapt for Alaska the revenue distribution system already in place in other states.

Further, section 28(b) is very limited in that it is applicable only to lands leased under the MLA, not to other federally owned lands leased under other authority. For example, section 35 of the MLA gave Alaska no share of receipts from the naval petroleum reserves, and Naval Petroleum Reserve No. 4 (now NPR-A), constituting roughly 23 million acres in Alaska, was separately addressed in Section 11 of the ASA. This separate treatment indicates that Congress did not intend, as argued by the State, that the MLA be a vehicle for an irrevocable 90 percent interest in revenues from all federal mineral lands.[10] This point is further supported by a 1981 Supreme Court decision in which the Court found that a 1964 amendment to the Wildlife Refuge Revenue Sharing Act, which included mineral revenues within its 75/25 distribution schedule, was properly applied to oil and gas leasing revenues from wildlife refuges on acquired federal lands in Alaska. Watt v. Alaska, 451 U.S. 259 (1981).[11]

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[9] All of the contiguous lower 48 states had already been admitted to the Union when the MLA was passed in 1920. The MLA was not "incorporated" into the statehood act of any other state.

[10] The State's argument implies that 90 percent of MLA revenues goes to all states, not just Alaska. This argument appears to be based on an interpretation of the MLA whereby the 40 percent of MLA revenues which is earmarked for the Reclamation Fund ultimately is returned to the states in the form of reclamation projects. This argument has several problems. The assertion that the 40 percent of MLA receipts from states other than Alaska is returned to the generating states is illusory. In fact, any such moneys that are returned to the states arrive there only through an express appropriation from Congress after competing with other appropriations proposals, and there is absolutely no guarantee that such moneys as are appropriated will be proportionately returned to the states from which they were generated. The 90 percent provided to Alaska, however, is distributed directly to the State, to be disposed of as the state legislature directs. To the extent Alaska argues that it has been treated the same as other states in receiving the 90 percent share of MLA revenues, it implicitly admits that equal treatment would allow Congress to change the MLA formula for Alaska,
(footnote continued)

Further, section 28 of the ASA did not purport to grant Alaska a 90 percent royalty interest in the minerals themselves. Rather, the section amended an entirely separate statute, the MLA, which itself does not grant the State any interest in minerals, but merely prescribes a formula for the distribution of certain federal oil and gas revenues. We have previously considered the issue of what interest states have in federal oil and gas under the MLA and concluded that they have no economic interest in the oil in place. As stated in Solicitor's Opinion M-36929, 87 I.D. 661, at 664, 665 (1980):

> States have no pecuniary or legal interest in federally owned oil until that oil is leased, extracted and the royalty payments are made to the federal government. In sum, sec. 35 simply

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because Congress clearly has the power to amend the MLA to affect the royalty shares of the other states. New Mexico v. U.S., 11 Cl. Ct. 429 (1986); affirmed, ___ F.2d ___, No. 87-1210 (1987).

[11] The case cited in the text focused on section 401 of the Revenue Sharing Act, 16 U.S.C. § 715s(c), which after the 1964 amendment provided that 25 percent of the receipts, including mineral receipts, generated by a refuge would go to the county in which the refuge was located and 75 percent to the Migratory Bird Conservation Fund. The Kenai Borough (the county in which the Kenai Moose Range is located), and the State of Alaska, each filed suit to challenge the federal interpretation that this formula applied to oil and gas revenues generated from the refuge. The U.S. District Court, District of Alaska, and the Ninth Circuit Court of Appeals each found in favor of the State of Alaska, that is, that section 35 of the MLA and not section 401 of the WRRSA, controlled the distribution of receipts from Kenai Moose Range. The Supreme Court held that the 1964 amendment clearly covered oil and gas receipts, but also found that it had not been the intent of Congress to amend section 35 of the MLA. Therefore, the court ruled that the WRRSA applied to oil and gas receipts from acquired lands in wildlife refuges, but not to reserved public lands in wildlife refuges. Watt v. Alaska, 451 U.S. 259 (1981). Even though the Court distinguished between acquired lands in refuges and public domain, this decision supports the proposition that Congress is not bound by the ASA to give Alaska 90 percent of oil and gas leasing revenues from all federally owned land.

> provides for the disposition of federal royalty revenue; it does not confer on states an economic interest in the oil in place. . . .

Therefore, under the amendment of the MLA contained in the ASA, the State receives only *a periodic distribution of 90 percent of the revenues produced* each year from the leasing and production of minerals under the MLA. Alaska receives no revenues under the MLA until such revenues are produced, and more importantly, receives its MLA royalty distribution only by virtue of the provisions of the MLA, not by virtue of the ASA.[12]

Our conclusion must be, then, that Congress was using the amendment to the MLA contained in section 28 not as a vehicle for granting the state a perpetual 90 percent interest in federal minerals in Alaska, but rather as an exercise of its authority under the Property Clause to dispose of and make needful rules for certain federal property, in this case, to set out the distribution scheme applicable to minerals leased under the MLA.

Our view that the MLA was not incorporated into the compact between the State and the federal government and that it does not amount to a permanent grant is supported by examples of cases in which Congress has exercised its Property Clause powers to amend the MLA since Alaska gained statehood to the detriment of Alaska's 90 percent interest in revenues from mineral leases. For example, on December 18, 1971, Congress passed the Alaska Native Claims Settlement Act (ANCSA), 43 U.S.C., § 1601, *et seq*., amending the royalty distribution ratio of the MLA to reduce the State's share of royalties and pay a portion to Alaska Native corporations. Section 9 of ANCSA, 43 U.S.C. § 1608, provided in part that a royalty of 2 per centum of the gross value of minerals and 2 per centum of all rentals and bonuses would be deducted from the mineral revenues from public lands and paid to the Alaska Native Fund. Prior to ANCSA, the standard royalty on oil and gas leases was 12.5 percent of production. This meant 1.25 percent went to the U.S. Treasury, and 11.25 percent went to the State of Alaska, whereas after ANCSA these percentages were 1.05 and 9.45, respectively.

Similarly, the Crude Oil Windfall Profit Tax of 1980, Pub. L. No. 96-223, 94 Stat. 229 (1980), exacts a tax on MLA revenues prior to the application of the revenue sharing formula. *New Mexico v. U.S.*, 11 Cl. Ct. 429 (1986), affirmed ___ F.2d ___, No. 87-1210 (1987). *See also*, Solicitor's Opinion M-36929, *supra*.

These examples clearly demonstrate Congress' continuing authority to change the distribution scheme for mineral revenues from federal lands whenever it perceives a need to do so.

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[12] In contrast, for example, the ASA explicitly granted Alaska 103,350,000 acres of land, which vested upon enactment.

CONCLUSION

For the reasons stated, we must conclude that Congress has the authority under the Property Clause of the Constitution to alter the distribution formula set out in the Mineral Leasing Act for oil and gas revenues from the Arctic National Wildlife Refuge. The State of Alaska has not met the heavy burden of persuasion with respect to the argument that those Property Clause powers were terminated by the section in the Statehood Act amending the MLA to include Alaska in the Act's revenue distribution formula. We can find no support in the Alaska Statehood Act for the proposition that the MLA was incorporated into the compact between the federal government and the State. In fact, opposite the proposition, we find other instances in which Congress has amended the MLA in a manner which adversely affected the State's interests.

Ralph W. Tarr

Ralph W. Tarr

The **Chairman**. And the answer will be it is okay to do so?

Mr. **Horn**. I think the answer we have given in the past is that the 90/10 formula is tied to the application of the Mineral Leasing Act, and to the extent Congress chooses the Mineral Leasing Act that would trigger 90/10. However, if Congress adopts new standalone authority, such as it did in leasing the National Petroleum Reserve, Congress then has the right to allocate the revenues in any fashion it sees fit.

Senator **Murkowski**. Mr. Chairman, would you yield on that point?

The **Chairman**. I think we had better—I think we will let you use your time on that one.

Senator **Murkowski**. I just have one point, and that is I believe that also the Statehood Act provides for 90/10 as well, and I would just request that the record so note.

The **Chairman**. OK.

Would you propose to offer all of the coastal plain of ANWR for leasing at one time?

Mr. **Horn**. I think that is a decision that we think that the authority ought to be to lease the entire 1.5 million acre area, with then, of course, the sequencing and which areas would get leased first, how much acreage gets offered at one time, to be decided pursuant to the NEPA process, much the same way we go through an OCS area and look at the entire study areas and then, based on the analysis, decide which area to offer first and which area to offer second.

Our position is that that type of authority be provided to the Department, for that type of very specific decision to be made after NEPA compliance.

The **Chairman**. OK. Senator McClure.

Senator **McClure**. Mr. Chairman, I have just a couple of questions.

I notice on page 4 and 5 you are talking about, of your statement, you are talking about the kind of test that would be applied with respect to adverse impacts. You use the term "reasonable," and of course in your mind you know what reasonable would be; that is what you would apply.

In my mind, I know what reasonable is; that is what I would apply. So they might be different.

What do you have in mind when you say "reasonable" when you are talking about the kinds of things that might be done to reduce the adverse effects, the kinds of things that might be done to mitigate the adverse effects relative to the costs or difficulty of accomplishing those tasks?

Mr. **Horn**. I think in our mind the general approach of reasonable is to—we know that any time we have human activity in a given area, there will be some level of effect. Our report indicated that most of the effects would be the phenomenon of displacement.

If we put down a drill pad or an overnight camping type facility, headquarters facility, that area will no longer be occupied and the animals will move off some appropriate distance.

So that what we are after here is to make sure that those impacts are kept not only to sort of a minimum level, but they do not interfere overall with general population dynamics and the general health and well-being of the herd. We understand—the reason that we have strived and asked for this "no unnecessary adverse effects" standard is that we understand that there will be some level of effects of human presence in the form of oil and gas operations.

We think that, done properly, those effects would be rather minimal, and if we employ the types of mitigation steps, all 29 of them outlined in the report, these impacts will be de minimis, as has been demonstrated from the operations in Prudhoe.

Senator McCLURE. But those tests on impacts are not yes or no tests? Are they not on a scale?

Mr. HORN. Yes, sir.

Senator McCLURE. With tradeoffs all up and down the scale?

Mr. HORN. Yes.

Senator McCLURE. And somewhere up the scale you have to say, no, the impact is too great, or somewhere along the scale you have to say no, the costs are too great. There is an economic test involved, is there not?

Mr. HORN. Absolutely. We would not want to employ or apply a series of environmental stipulations that would have a net effect of basically wiping out the practicality of pursuing oil production in the area.

It is our judgment, based on years of experience in Prudhoe Bay, what we have been able to glean from the drilling operation there on the native lands, from some of the drilling operations on the Canadian side of the border, that it is well within our technological grasp presently with present technology to generate and put together programs and reasonable, practical cost effective stipulations that can permit the activities to proceed and at the same time provide a more than reasonable and adequate level of protection of the wildlife resources.

Senator McCLURE. I assume—and stop me if I am wrong, but I assume that those are highly judgmental matters of opinion.

Mr. HORN. Yes, sir.

Senator McCLURE. As to what are the acceptable tradeoffs, there are people of every shade of opinion as to whether or not the choices made are reasonable.

Mr. HORN. That is correct.

Senator McCLURE. I would also submit it is impossible to define those in legislative terms precisely.

Mr. HORN. I think the general approach that has been employed in the past has been, we have had all sorts of standards—no significant adverse effects. We have had a full range that we have employed in the past, all of which have been subject to levels of litigation.

We have looked at it and concluded that the "no unnecessary adverse effects" standard was clear, precise. We did not get into the reasonable man test that drove some of us nuts while we were in law school and has continued to cause scads and scads of litigation in the intervening years.

That is why we think this "no unnecessary adverse effects" test, tied into the reasonable mitigation standards, is the way to go. We think it is more precise and, based on the stipulations we have developed, will do the job of protecting the environment.

Senator **McClure**. Are those standards to which you referred, standards that have been tested in court?

Mr. **Horn**. Not yet.

Senator **McClure**. The terminology you use is new terminology?

Mr. **Horn**. That is correct.

Senator **McClure**. And being new terminology, will it be tested in hearings, administrative and legal?

Mr. **Horn**. Yes, sir.

Senator **McClure**. Are there more tested terms that could be better used?

Mr. **Horn**. Well, there has been litigation over such as "no significant adverse effects." One of the terms that we did want to stay away from was the compatibility test that now operates in units of the wildlife refuge system, which has been prove to be a rather amorphous term. That one we think would not lend a precision in the regulatory arena, and hence we recommended that we go with this, as I said, the no unnecessary adverse effects test.

We examined the full array and came to the conclusion that the language we put forward in the 1002 report was in our considered judgment the best way to proceed.

Senator **McClure**. I was certain that would be your answer, because obviously you would not have suggested that otherwise. But I did want to get into the record the fact that there are other ways in which you could have approached it, but you have looked at those other ways and have determined that in your judgment this is the best way to approach this problem at this time.

Mr. **Horn**. Yes, sir.

Senator **McClure**. I took a little time to explore that, because if there are others who will testify, who believe there are other legislative enactments that could better define what it is we are attempting to do, they should be invited to express themselves.

I do not know how you eliminate subjective evaluations.

Mr. **Horn**. I do not think you can. Any time you vest something to the discretion of an executive agency, there is going to be judgment calls. I think what we have tried to put together is a standard, coupled with stipulations, that provide a fair degree of precision and assurance to all the interested parties, which would, as indicated, pursue the double goals that we think are important here of: one, an orderly program to get at the prospective oil and gas resources; and two, to make sure that, while seeking to bring those resources to market, we do not have adverse effects on the long term health and well-being of the ecosystem of the coastal plain.

Senator **McClure**. Mr. Chairman, I will not take long to explore this conflict question, because there a number of conflicts that will become obvious, if they are not obvious already.

The next witness on the list is from the Environmental Protection Agency, and it is presumed that the Environmental Protection Agency is a single purpose agency dedicated to the preservation or the protection of the environment. There are others who say, well yes, but they are not doing that very well because they think about other things, too, and therefore since they cannot really do their job if they think about more than one job, the environment does not get protected properly.

And I know that debate is focused on criticisms of them. I know the debate is also internal to the Environmental Protection Agency.

But you have the same problem, do you not? I notice that the Department of the Interior sends up as its lead witness here somebody whose primary job description of the nation's energy supplies.

Mr. CASON. That is why I am up here, guarding him.

Senator MCCLURE. Are you really guarding him?

Mr. CASON. Yes, I will kick him if he gets out of line.

Senator MCCLURE. The reason I mention that is it is presumed that you are supposed to be looking after fish and wildlife, and how in the world could you look after fish and wildlife when you are looking for oil?

Mr. HORN. As I said, we are here to testify on behalf of the Secretary, and it is a wildlife refuge, which is why I am the witness. And it is based on the studies and the work that was done over the past that led us to the conclusion that we could pursue the energy without adverse effects on wildlife.

Senator MCCLURE. But there someone else within the Department of Interior that is looking after other issues than fish and wildlife; is that correct?

Mr. HORN. That is correct.

Senator MCCLURE. You have tensions within the Department. You have points of view. You have discussions. You have subjective, not necessarily objective, valuations of the tradeoffs, do you not?

Mr. HORN. That is correct.

Senator MCCLURE. Within the Department?

Mr. HORN. Yes, sir.

Mr. CASON. A considerable number over the last year.

Senator MCCLURE. And I think the same thing is true with respect to within the Environmental Protection Agency and between the Environmental Protection Agency and the Department of the Interior.

Mr. HORN. Let me add that the standard that we are talking about would be applied to the Department's decisions regarding leasing and rights of way activity. We are not recommending in any manner, shape or form that this standard supersede any existing environmental laws in terms of clean air and clean water and hazardous wastes and affecting State programs, but this standard be related basically to the on the ground decision of whether to lease an area, how to judge exploration plans from the Department's perspective, and how to site rights of way as related to oil and gas facilities.

So it is a fairly narrow standard in that sense.

Senator MCCLURE. It does settle one issue, and that is the sufficiency of the legislative environmental impact statement.

Mr. HORN. Well, what we have asked is that the legislative environmental impact statement that is incorporated into the 1002 reports be statutorily recognized as the programmatic LEIS, so we do not have to go back and do a whole new programmatic LEIS on whether or not to lease if Congress were to open the area.

We have recommended, however, that once we cross that threshold that any decision to conduct a lease sale in the area, that that be subject to NEPA compliance by the Department.

Senator McCLURE. So each succeeding step has to go through each step's EIS process?

Mr. HORN. That is correct.

Senator McCLURE. Now, that would apply also to transportation, both the transportation across the refuge for the drilling activities and transportation of oil if oil or gas is discovered, with respect to any construction of any pipeline?

Mr. HORN. Any discretionary act by the Secretary in granting a right of way or granting a lease, approving an exploration program, any of those discretionary acts that would be considered to have a major effect on the environment would trigger, of course, EIS and NEPA compliance on our part.

Senator McCLURE. You have suggested the necessity of giving the lessees the certainty that they would be permitted to operate if they find commercially available quantities of oil and gas.

Mr. HORN. Yes, sir.

Senator McCLURE. Does it also apply similarly to the assurance that they will be able to transport oil and gas?

Mr. HORN. Again, we have asked that the same standard be applied on the leasing side of the equation, the exploration and production approvals, and that same standard also apply to the granting of rights of way.

We think that it is all tied together, so that there is some assurance and provision provided to the lessees in terms of this no unnecessary adverse effects standard, that it be uniform across the board for all of these aspects of development.

We think that that, coupled with the specificity that we have outlined in our report, the type of on the ground application we have done where the KIC well was drilled, gives the industry some assurance and some indications of the directions that the Department is moving in, how we would apply those types of standards on the ground, so that there is some level of predictability.

There are no guarantees, of course. But I think that it does provide them some level of predictability.

Senator McCLURE. I note in your statement you say you do not think you can meet a 1-year test; it would take you 18 to 24 months to take the next step after legislation is passed.

Mr. HORN. That is correct. If we have to comply and prepare a full environmental impact statement, that process for a lease sale takes 18 to 24 months.

Senator McCLURE. And then every activity after that would also require 18 to 24 months?

Mr. HORN. It depends. We have what is called a tiered process, and once we go through the leasing EIS, if someone comes in for the permit to drill an exploration well, depending on how long they want to be there, how deep they want to drill it, we may get by with a supplemental EIS, we may get by with an environmental assessment.

But we would have to engage in the NEPA screening process basically every discretionary act we would pursue.

Senator McClure. That would include the necessity, the same kind of necessity with respect to a pipeline?

Mr. Horn. That is correct.

Senator McClure. Because certainly, if you discover oil and gas, oil has to go somewhere, and we will be back to the same kind of debate we had with the Alyeska, will we not?

Mr. Horn. Well, we are asking in this case that the Congress provide us with the authority to grant rights of way from any leases within the 1002 area, across the 1002 area to basically, we suspect, go over and link up with the Trans-Alaska Pipeline System.

So that if we are provided that executive authority up front, we would avoid the circumstance that we all found ourselves in in 1973, that it took an express act of Congress to authorize that Trans-Alaska Pipeline.

Mr. Cason. In addition, we are also asking for the ability to suspend leases pending the transportation availability.

Senator McClure. I noted that, because you are assuming, I think, in your statement that there may be some prolonged discussion about whether right of way will be granted.

Mr. Cason. We are trying to anticipate that if that were the occurrence that leases would not be voided out for lack of production in those circumstances.

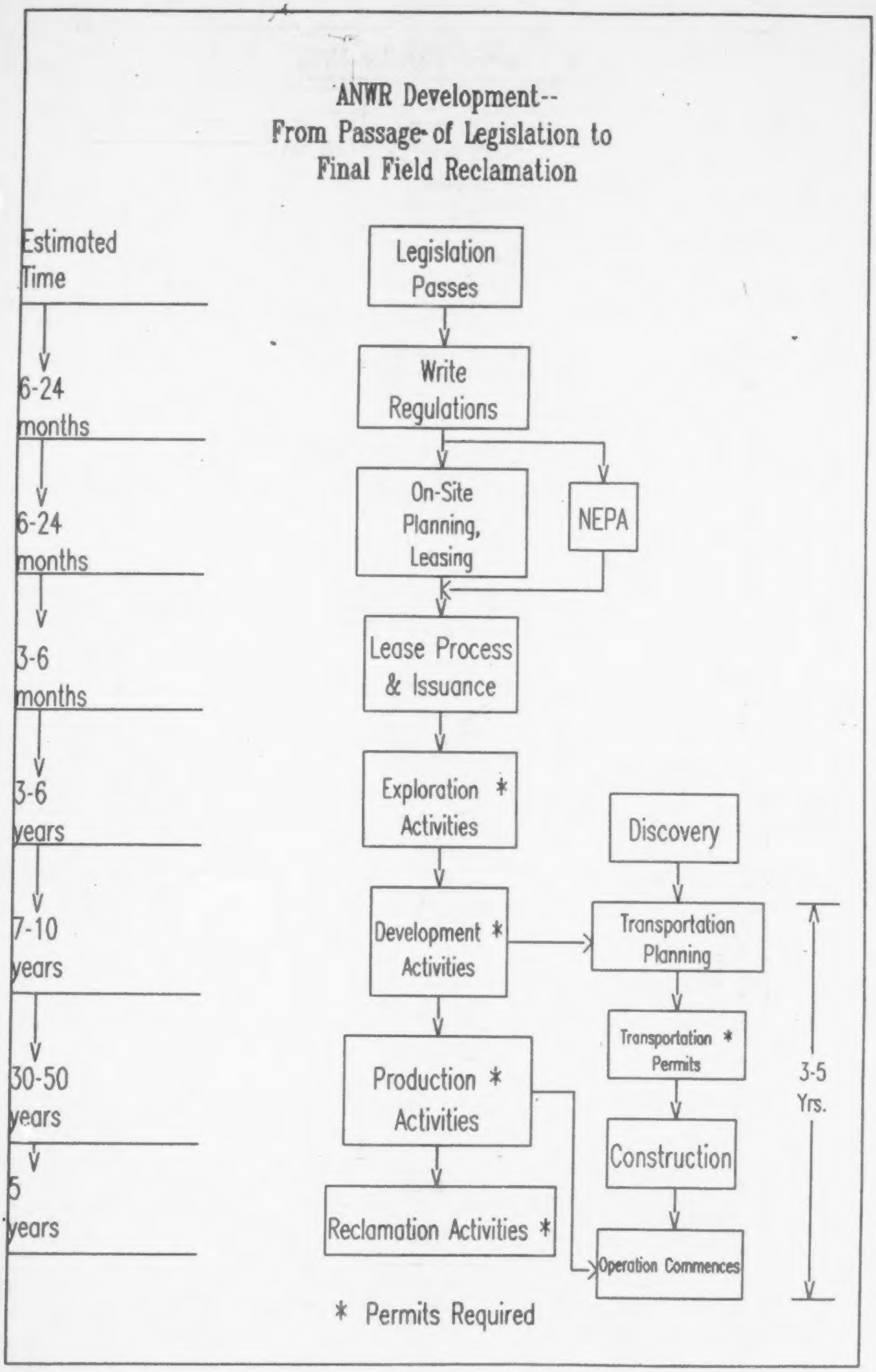
Senator Bumpers. Would the Senator yield?

Senator McClure. Surely.

Senator Bumpers. I am really curious about the point that you are making, and that is you are suggesting that the legislation before us would permit drilling in the 1002 area, but you are suggesting that you would not be allowed to get oil out of that under this legislation, is that correct?

Mr. Horn. No, sir. We are just outlining the numerous steps that we are going to have to go through if legislation were passed authorizing us to conduct a lease sale. We would have to conduct an environmental impact statement or engage in NEPA compliance on the first lease sale.

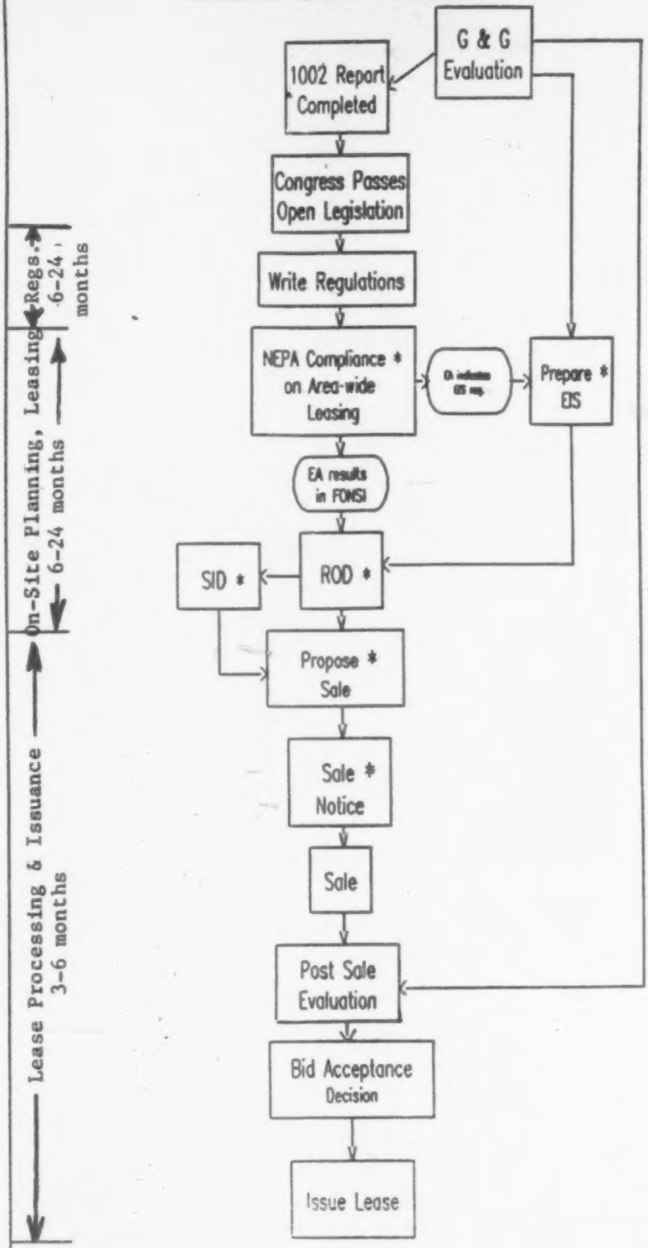
[The time-line charts follow:]



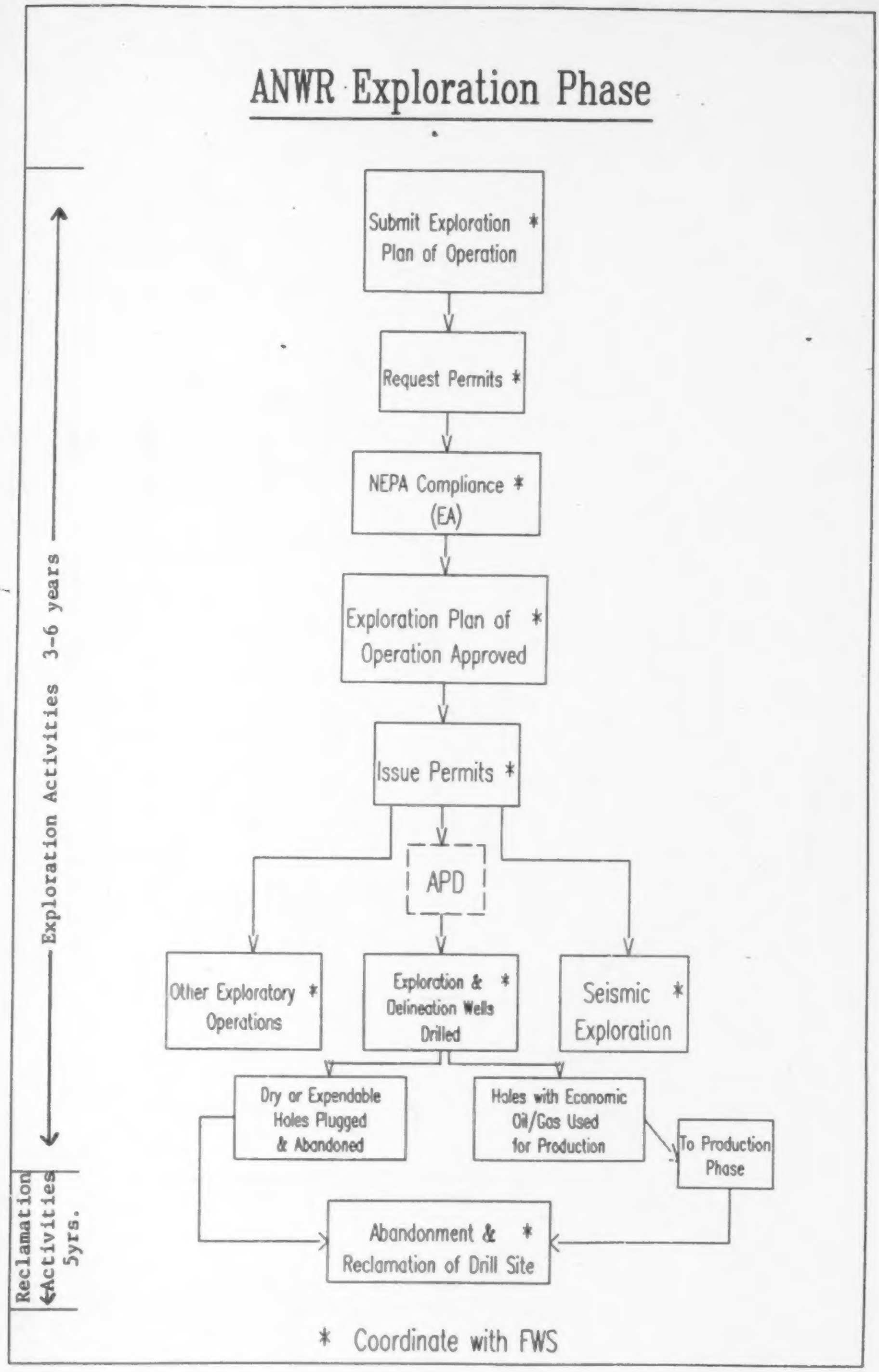
ANWR Development--
From Passage of Legislation to
Final Field Reclamation

Estimated Time
6-24 months
6-24 months
3-6 months
3-6 years
7-10 years
30-50 years
5 years
Legislation Passes
Write Regulations
On-Site Planning, Leasing
NEPA
Lease Process & Issuance
Exploration Activities *
Discovery
Development Activities *
Transportation Planning
Transportation Permits *
Production Activities *
Construction
Reclamation Activities *
Operation Commences
3-5 Yrs.
* Permits Required

O & G Leasing Plan for ANWR


G & G Evaluation
1002 Report Completed
Congress Passes Open Legislation
Write Regulations
NEPA Compliance * on Area-wide Leasing
Prepare * EIS
EA results in FONSI
ROD *
SID *
Propose * Sale
Sale * Notice
Sale
Post Sale Evaluation
Bid Acceptance Decision
Issue Lease
Regs. 6-24 months
On-Site Planning, Leasing 6-24 months
Lease Processing & Issuance 3-6 months

* Coordinate with FWS

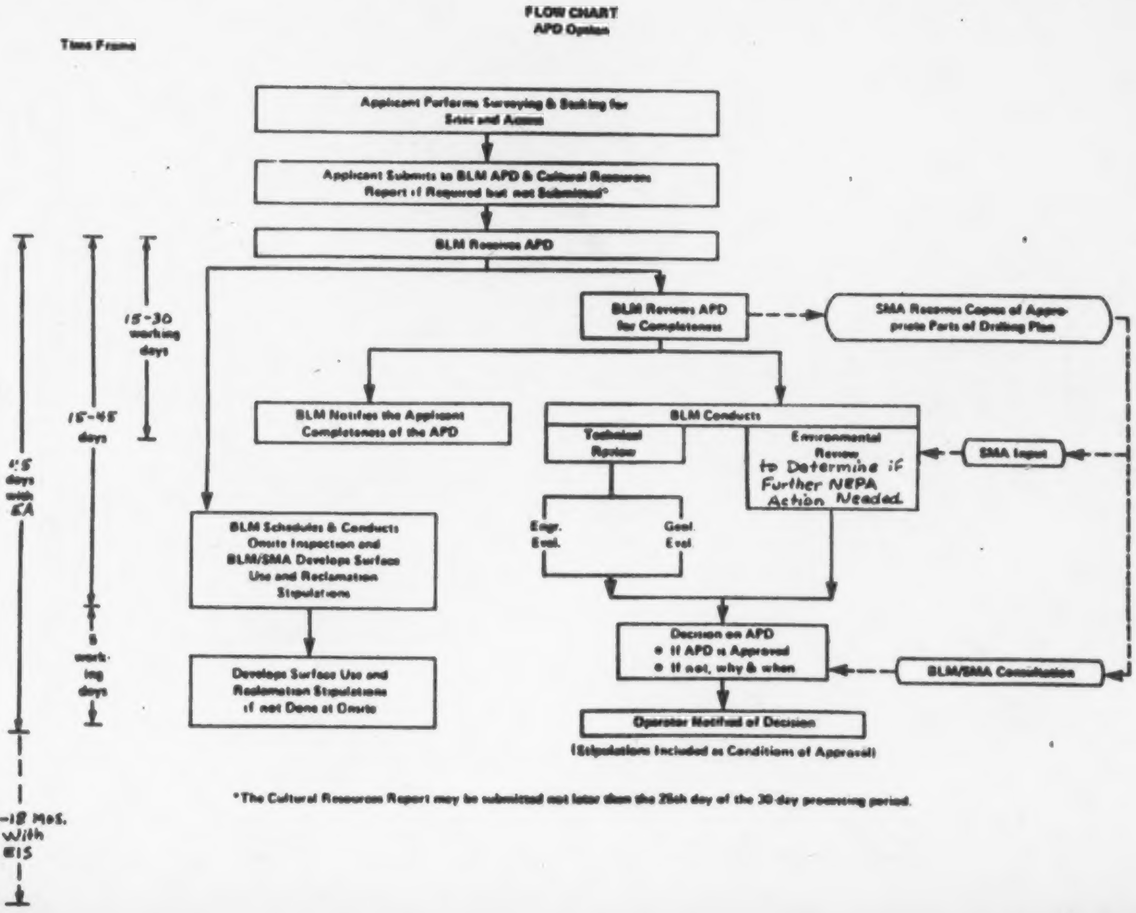


ANWR Exploration Phase

Submit Exploration Plan of Operation *
Request Permits *
NEPA Compliance * (EA)
Exploration Plan of Operation Approved *
Issue Permits *
APD
Other Exploratory Operations *
Exploration & Delineation Wells Drilled *
Seismic Exploration *
Dry or Expendable Holes Plugged & Abandoned
Holes with Economic Oil/Gas Used for Production
To Production Phase
Abandonment & Reclamation of Drill Site *
Exploration Activities 3-6 years
Reclamation Activities 5yrs.

* Coordinate with FWS

APPLICATION FOR PERMIT TO DRILL AND SUBSEQUENT OPERATIONS

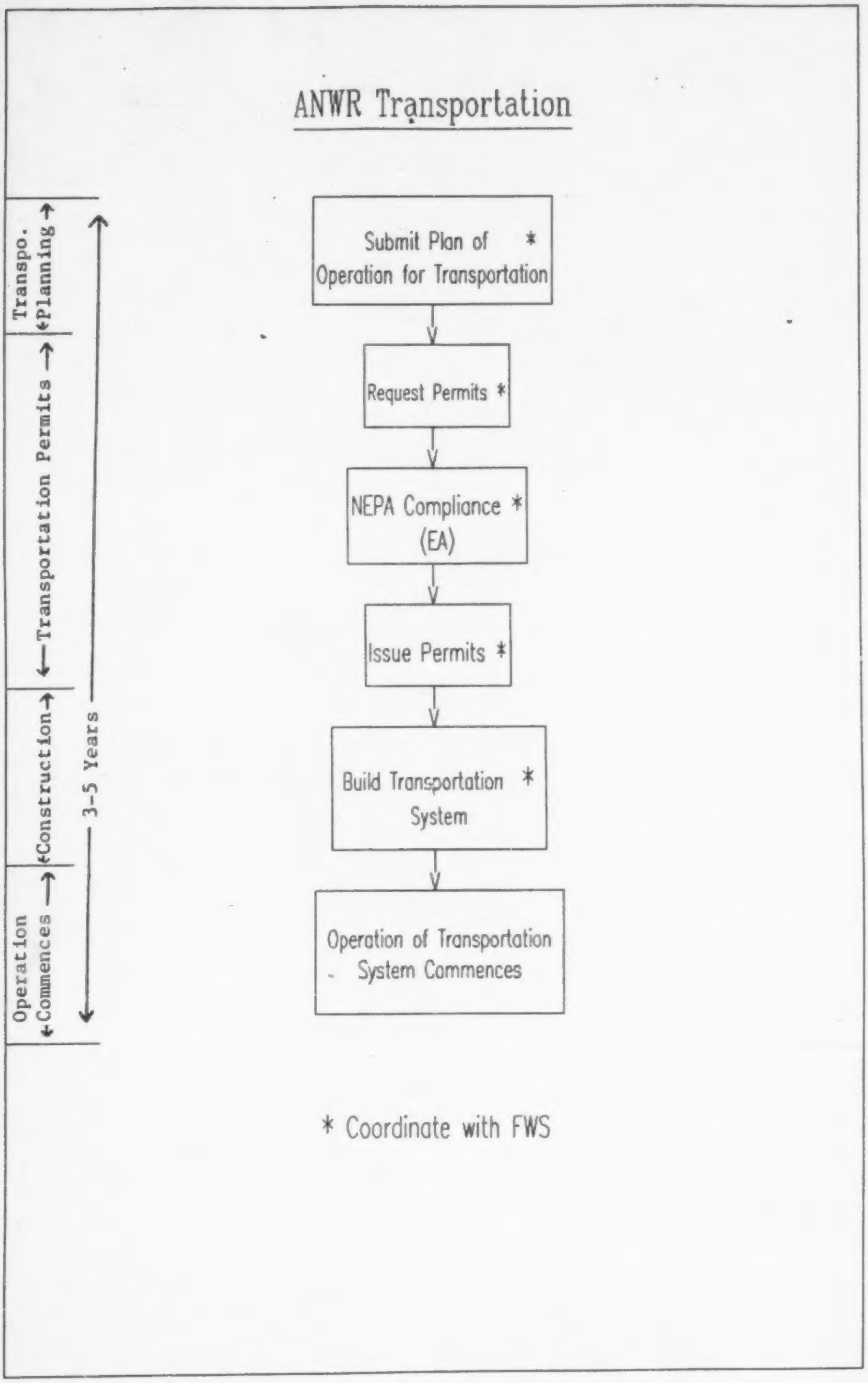


FLOW CHART
APD Option

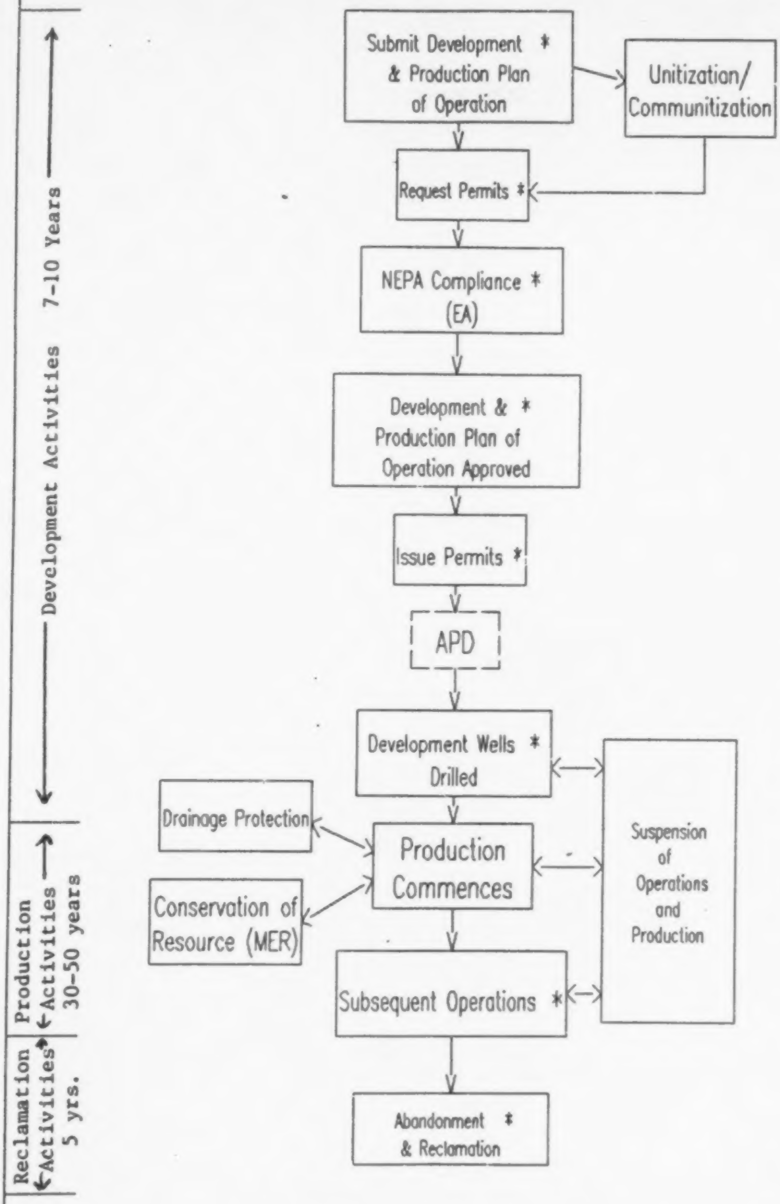
Time Frame
15-30 working days
15-45 days
5 working days
45 days with EA
12-18 Mos. With EIS
Applicant Performs Surveying & Staking for Sites and Access
Applicant Submits to BLM APD & Cultural Resources Report if Required but not Submitted*
BLM Receives APD
BLM Reviews APD for Completeness
SMA Receives Copies of Appropriate Parts of Drilling Plan
BLM Notifies the Applicant Completeness of the APD
BLM Conducts
Technical Review
Environmental Review to Determine if Further NEPA Action Needed
SMA Input
Engr. Eval.
Geol. Eval.
BLM Schedules & Conducts Onsite Inspection and BLM/SMA Develops Surface Use and Reclamation Stipulations
Develops Surface Use and Reclamation Stipulations if not Done at Onsite
Decision on APD
• If APD is Approved
• If not, why & when
BLM/SMA Consultation
Operator Notified of Decision

(Stipulations Included as Conditions of Approval)

*The Cultural Resources Report may be submitted not later than the 25th day of the 30-day processing period.


ANWR Transportation
Transpo. Planning
Transportation Permits
Construction
Operation Commences
3-5 Years
Submit Plan of Operation for Transportation *
Request Permits *
NEPA Compliance * (EA)
Issue Permits *
Build Transportation System *
Operation of Transportation System Commences
* Coordinate with FWS

ANWR Development & Production Phase


Development Activities 7-10 Years
Production Activities 30-50 years
Reclamation Activities 5 yrs.
Submit Development & Production Plan of Operation *
Unitization/ Communitization
Request Permits *
NEPA Compliance * (EA)
Development & Production Plan of Operation Approved *
Issue Permits *
APD
Development Wells Drilled *
Drainage Protection
Production Commences
Conservation of Resource (MER)
Suspension of Operations and Production
Subsequent Operations *
Abandonment & Reclamation *

* Coordinate with FWS

Mr. HORN. Then assuming a sale is held successfully and people compete and are awarded bids, then a number of the lessees come in and they want the exploration program to proceed. So they come in and apply for the myriad permits from both State and Federal agencies necessary to drill exploration wells.

Some of those permit issuances, be it a 404 permit by the Corps, be it some of our permits within Interior, be it some of the permits you would get from EPA, some of those permitting procedures will require NEPA compliance and may require completion of a full EIS.

Let us assume then that one of those wells turned out to be successful and they find a billion barrel oil field. At that point, the lessees come back in with their production plan. Again, all of the Federal and State—or the Federal permits that would have to be issued to permit production facilities to be put in place, that will require NEPA compliance.

And of course, you need the linkup with the Trans-Alaska Pipeline. You would expect that same lessee to make an application for a pipeline to link up the 1002 area with mile one of the pipeline. That of course would require NEPA compliance as well.

I think it is just a demonstration of the numerous steps that the agency would have to go through and the lessees would have to go through in order to bring any discoveries—to engage in any exploration, drilling, and then bring any discoveries to market.

This does not happen very rapidly. It takes a lot of time.

Senator BUMPERS. What was it we were referring to, Senator, about getting an executive order to do that? Did I misunderstand you to say that you simply wanted an executive order to permit you to build a pipeline across——

Mr. HORN. We would ask that Congress provide the Department the authority to issue pipeline rights of way across the 1002 area under the same "no unnecessary adverse effects" standard, so that we do not—in 1973, the problem that cropped up with the trans-Alaska was that the Department under the rights of way authority at that time lacked the authority to issue the necessary right of way and hence had to come back to Congress for a specific grant of authority.

We would like that grant of authority in advance, so we can do it as an executive branch matter, rather than bring another ANWR issue back to you.

Senator MCCLURE. But it would still be subject to all the rest of the procedures.

Mr. HORN. Yes, sir.

Senator MCCLURE. I make only two points here. One is to ask you if you can give us a chart of the possible permitting requirements, the time line, if you will, from this time to actually getting any production to the lower 48, assuming—you have to make a lot of assumptions in that—but assuming that we pass the legislation and somebody bids on a lease, that they are successful in getting the lease, that they move forward and they are successful in drilling and they find something and they go move forward and actually get production down to the lower 48.

I will predict right now that you will have a time line that is more than 10 years long.

Mr. **Horn**. That is why we have always focused in terms of the should this area be opened debate that we are talking about domestic oil supply in the 21st century, because if you look at Prudhoe Bay as an example, discovery was made in 1968, oil did not flow until 1977.

And that process was somewhat accelerated because in the middle of that we suffered the Arab oil embargo, which provided a fair degree of incentive to move forward. In this particular case, we take that same nine years and then tack on this 18 to 24 month period to get to the first lease sale.

And in our mind you are looking at reasonably 10 years, if not more if you have a number of judicial challenges.

Senator **McClure**. Mr. Chairman, I think you could anticipate there would be legal challenges, and that you also have to guess with respect to any such time line.

I guess the only point I am making is that there are two ends of it. One is that we have a regulatory nightmare for anybody that wants to do anything in this country, and that adds to the cost of doing business and it decreases our ability to compete in foreign markets. It decreases the economic strength of this country and it decreases job opportunities for Americans.

It has a whole lot of adverse effects, as well as the beneficial effects that flow from the purposes of the regulations. And I am not suggesting now that we are going to wipe all of that out, but I think people ought to look at it in the context of how little it is that we do to really make ourselves competitive in the world today, as contrasted with how much we do to make it difficult to be competitive in the world today.

The second point that I would like to make in this regard is to focus our attention on the little that is done in proposed legislation that moves the process toward any kind of successful conclusion. That is the reason I asked the question about reasonableness and the economic tradeoffs that are involved.

You can at some point, even with the prospect of a lot of oil, increase the marginal cost to the point that marginal results are not even sought; we just simply do not touch it. I do not care whether it is this or some other natural resource utilization question, or even the siting or location of a factory.

The United States is perilously close to crippling ourselves beyond the ability to survive in an increasingly competitive world, and the standard of living of Americans and the economic expectations of Americans are being sacrificed to some degree, and perhaps rightfully so. But we should not kid ourselves as to the aggregate impact of what it is we do as we focus on one particular problem.

One final question, Mr. Chairman. On page 1 of your statement, you talk about the mean projection of possible reserves to be found. How was that figure derived? What does that word "mean" mean?

Mr. **Horn**. Basically, when the geologists from the U.S. Geological Survey and the Bureau of Land Management were looking at the economics on the reserve side, take all of the data that was gathered, assess it, run it through their computer models which do the predictions, and essentially when you ran a large variable number of predictions about what you are likely to find, the mean case that came out was 13.8 billion barrels of resources.

Now, that is the in-place number, and then some percentage of that will be recoverable, depending upon economic and technological factors. Our current prediction, again the mean case, is that, if commercial oil is found, that we are looking at a mean case of 3.2 billion barrels of oil.

Senator McClure. That is not a simple arithmetic average?

Mr. Horn. No, it is not. It is a result of this computer model, and I would have to have the guys from Reston who put these models together to come up and explain them to you in detail.

Senator McClure. Never mind. I do not want to know what they did. I just want to know what the result was. Thank you.

The Chairman. Two comments before I recognize—I think Senator Bradley came in next.

First, I wish you would give us something in writing on this ten year standard. It seems to me that a 10-year lease standard is rather meaningless, that there ought to be a new standard, maybe like—maybe they ought to have to submit like a mining claim, like they do with hard rock minerals, something like that, with due diligence or some standard like that.

[The information follows:]

We do not at this time have a recommendation on the length of the primary lease term for leases to be issued in the 1002 area. This issue is, however, currently being reviewed within the Department. It appears that in most instances it will be preferable to offer primary lease terms that are longer than 10 years or to provide some flexibility for extension of the primary lease terms. However, more review is needed before we can define the appropriate length of a primary lease term or the specific criteria that should be considered in granting extensions.

The Chairman. Secondly, I would tell my committee members we are going to have to do better than the standard set by the chairman and the ranking minority member on time if we are going to hear from all the witnesses.

So with that, I will recognize Senator Bradley.

Senator Bradley. Mr. Chairman, I think that Senator Ford was here before I was.

The Chairman. Yes, excuse me. I apologize. Senator Ford is next.

Senator Ford. You can open the curtains.

Senator Bradley. I will reclaim my time.

Senator Ford. You are never going to make it, Bradley.

Mr. Chairman, I do not object to the chairman and taking more than the normal ten minutes or whatever, because they are saddled with the responsibility of leadership on this committee, so I have no problems with that at all.

I think the rest of us ought to be limited maybe to 10 minutes, and I will try to adhere to that.

I think we have one basic problem that we are going to have to face here: Will this bill as it relates to ANWR be a stand-alone bill or do we have to integrate it into all the other standards, or will it just be a bill as it relates to ANWR?

I think that will be a decision we will have to make later. But I do think it is something we are going to have to look at and look at very hard.

I find myself watching the procedure start, as I have watched others, how we really get to the drilling and how we really get to something that there is a lot of opposition to. So we begin to use two words: "trade off"; what is the trade off?

It is not only trade off as it relates to those who are opposed to something; it is trade off as it relates to this, that, and the others. We begin to get into the trade off area. I grew up in an era when we did a lot of trading, but we did not have any trade offs.

But let me just ask you a question. Are we not getting to a position as it relates to your statement and the questions you have answered and received this morning with so many provisions that you are relating to to protect the area or to satisfy those who are opposed to ANWR, are you not begging violations of the regulations?

Mr. HORN. Mr. Chairman, we do not think so. We think clearly if the right standards are applied and clear authority is provided to the Department along the lines we have outlined, we think that we will have a program that we can pursue, one that we can pursue with some assurance that, one, we can go ahead with the drilling program and at the same time protect the environment.

Very clearly, I have no illusion. Someone someplace is going to file suit and bring charges against us that we failed to do our job.

Our expectations are, however, a clear standard with the types of mitigations and stipulations we have outlined will permit us to proceed in an orderly fashion. So we think it is a reasonable approach, with no guarantees.

Senator FORD. I understand what you are talking about when you say a mean case. I talked to a lawyer one time that said the only cases he had were mean.

Tell me the difference between no unnecessary adverse effects and no adverse effects?

Mr. HORN. I think no adverse effects, based on litigation that we have been involved in over the years in other regulatory programs, is an absolute standard: Any adverse effect is barred and prohibited.

We have clearly acknowledged that there will be some adverse effects in an absolute sense from human activity in the coastal plain. The siting of a road, drilling a pad, putting in a drill pad—that level of human activity, some of the helicopters and airplanes flying around, all have some level of adverse effect by causing the animals to move off a half a mile, by causing some change in behavior.

Those have all been construed to be adverse effects. We think that any application of such an absolute standard would cripple the prospects of any exploration and development activities out there.

Hence we have said "no unnecessary adverse effects," meaning our job as regulators is to ensure that all of those types of adverse effects can be minimized, reduced to sort of an *n*th degree, through the application of standards and stipulations, time and space zoning, and appropriate technology, so that the adverse effects that remain are basically those that we just cannot do anything about, and that is the acceptable part of the trade off.

We are willing to trade that level of minimal adverse effects to get at this enormous hydrocarbon potential.

Senator FORD. Well, have you litigated the "no unnecessary adverse effects"?

Mr. HORN. No, sir, we have not.

Senator **Ford**. So you do not really know what that means?

Mr. **Horn**. We have outlined in our mind what we think it means. We think we have defined it. We have attached to it the types of stipulations. We were struggling to put together a standard that met the dual goal of get at the oil and gas and protect the environment.

We think this standard does it the best of anything we have dealt with. But you are correct, it is untested in the courts, and I am always loathe to make predictions of what the third branch of Government will do when it gets an issue before it.

Senator **Ford**. Well, you might be surprised. What about "no necessary adverse effect"? You have no adverse, no necessary; how about "no necessary adverse effects"? Unnecessary would be the same thing. You word merchants really have this country.

Mr. **Horn**. No, it would basically be the same as an absolute standard. If you say you could have no necessary adverse effects, that would basically be saying there are no adverse effects allowed, because we are acknowledging there will be some necessary adverse consequences, which we think they are very de minimis, which have to be accepted if we want to pursue the oil and gas potential in this area.

Senator **Ford**. Has "significant adverse effects" been litigated?

Mr. **Horn**. Yes, it has. The problem we had with that was that, again, as Senator McClure indicated, "significant" begins to get into the real of what is reasonable. What is significant to one person? A pregnant cow having to move 2 kilometers away from human activity, we have already had people tell us in our public comments that that is a significant effect.

In my subjective judgment, since the pregnant cow can move over and successfully drop her calf, the fact that she had to move a couple of kilometers to me was not a significant effect.

Significance and reasonableness are sort of at opposites sides of the same coin, that they injected a level of uncertainty that we were trying to avoid in a regulatory program.

Senator **Ford**. I sure do not want to get into reasonable. I will leave it there, Mr. Chairman.

The **Chairman**. Senator Murkowski.

Senator **Murkowski**. Thank you, Mr. Chairman. A point that has been referred to by the Senator from Idaho concerning the 18 to 24 months to complete the environmental impact statement and which the chairman has also touched on. I guess for the record, could you explain why you need another EIS in addition to, I think you said, programmatic EIS that is in the 1002 report?

The lead time that has been indicated here of anywhere from 6 to 8 to 10 years is obviously of some concern, and there is reason to believe that it may be longer than that.

I guess the question is, is it mandated that there is a necessity for another EIS report in addition to the programmatic EIS and the 1002?

Mr. **Horn**. Under current law, unless Congress provides us with a dispensation for the Secretary to exercise and go ahead with the leasing program after a grant of authority by Congress, that would be a major Federal action affecting the environment that would trigger the application of section 102 of NPRA unless Congress provides a waiver for that.

So the law does require us to engage in that 18 to 24 month activity as the law presently stands.

Senator MURKOWSKI. Is it not a matter of putting more resources during the time frame to complete it? It is actually, in your opinion, that timeconsuming?

Mr. HORN. Yes. It is not so much the preparation, which does take time, but the NPRA process as outlined in the CEQ 1500 series regulations; the number of interagency reviews, the scoping process, the public review procedures, the 30-day cooling off period before we can issue a final EIS.

When you add up all of those time frames, if you want to comply with the 1500 regs, which we are required to do by law, there is just a very large chunk of time devoted to just those time sequences. Even if we took the whole Department and put it to work, we could not shorten it.

Senator MURKOWSKI. So it is somewhere out there. If you were in a position to outline a best case scenario, and this committee and the House committee decided to move on this legislation, when would you anticipate, roughly what year, the proposed lease sale would occur?

Mr. HORN. I think you would have to add either 18 or 24 months.

Senator MURKOWSKI. I can add, too, but give me a year.

Mr. HORN. We are talking 1990 or 1991.

Senator MURKOWSKI. 1990 or 1991 before the first lease sale?

Mr. HORN. That is assuming that we were successful in our litigation, which I suspect is inevitable.

Senator MURKOWSKI. So after that, then you are looking at 6, 7, 8 or 9 years before the oil would be on line?

Mr. HORN. You are probably looking at the first year to get the lease. Then after the lessees have found out which tracts of property they have, they put together their exploration plans. They come back in for all the necessary Federal permits, which process can take a year or two to clear if it is moving quickly. So if you have a lease sale in 1990 or 1991, you probably will not have your first exploratory well until 1993 or 1994.

Senator MURKOWSKI. Now, you use an estimate of the revenues from the lease sale of $2 to $4 billion.

Mr. HORN. Yes, sir.

Senator MURKOWSKI. Is it fair to suggest that one could average the difference and come up with an anticipated realistic number somewhere in the area of $2.5 to $3.5 billion? Do you come by that based on prevailing price or a price in the year 2000?

I am curious to kmow whether it would be reserves at today's price or reserves in the year 2000 as to what the revenue would be to the Federal Government.

Mr. HORN. It is all a function of predicting, number one, what we think is present in terms of the geology. So we have had folks take a run and figure out what they think——

Senator MURKOWSKI. What their reserves are. I understand that.

Mr. HORN. What their reserves are and actually what is the fair return that the Government needs to get on a given lease, which we obviously are proscribed and prohibited.

Senator MURKOWSKI. That is based on 13.8 billion barrels of recoverable oil?

Mr. HORN. Yes.

Senator MURKOWSKI. At what price?

Mr. HORN. The model for predicting the reserves is $33 per barrel. Obviously, the value of how much we would derive in terms of bonus revenues is going to be highly dependent on what the world oil price is and what the industry thinks the price will be 10 years from now.

Senator MURKOWSKI. Are you using a year 2000 estimate in this figure of achieving $2 to $4 billion?

Mr. HORN. I think we are using about $30 a barrel in the mid-1990s as the price estimate to generate the $2 to $4 billion number.

Senator MURKOWSKI. What new considerations would you look at in an environmental impact statement for the first lease sale that you have not already considered?

Mr. HORN. The function there would be, assuming that we were granted the authority that we have requested, which would be to have the authority to lease the entire 1.5 million acres with no particular geographic areas off limits, the primary focus would be on do we lease the entire 1.5 million acres or offer it; do we offer a portion of it; what portions of it do we offer?

If we offer portions that might be considered by some to be sensitive, what types of very specific stipulations do we want to apply to those areas as opposed to others?

I will give you an example. When we were doing the NPRA leasing program, just as an historic note, when Congress authorized us to lease that area in 1980, they did provide us a NPRA waiver for the first lease sale. Congress did designate two areas within the NPRA as environmentally sensitive and said that if you want to lease them you have to do something extra special over there.

If we were to lease the 1002 area, our NPRA documents would examine if we should lease the entire place, and if we are going to lease some of these, what might be construed as sensitive areas and what special stipulations, if any, do we want to apply in those realms. Those are the types of things we would look at during that 18 to 24 month period.

Senator MURKOWSKI. With regard to the NPRA compliance, do I understand this to be an alternate, no action alternative in the environmental impact statements after the legislative authority was given to lease?

Mr. HORN. Yes, sir.

Senator MURKOWSKI. You are putting in a pipeline distribution. You have lease sale.

Mr. HORN. Obviously, one of the options we almost always look at in preparing a NPRA document is no action, and the Secretary, whomever it may be, would have the authority to say no, the Department will not conduct a lease sale unless Congress provides otherwise in the enabling legislation.

Senator MURKOWSKI. In determining unnecessary adverse effects, I am curious to know how much consideration is given to the economics? In your statement at page 5, I think, you said, "In developing our 1002 report we had defined 'unnecessary adverse effects' to mean" et cetera.

In other words, might some particular technology be appropriate but very expensive? The question is would you necessarily require its use? Do the economics dictate an elimination of a technology, or is it mandated to use the very best regardless of lease?

Mr. HORN. That is why we chose in providing the definition that it be that level of that can be reasonably avoided by appropriate technology and engineering.

We wanted to stay away from the best available technology approach, which was one that we considered, simply because in many cases the best available technology may be so prohibitively expensive that it kills the economic practicality of pursuing an oil and gas project. We did not want to find ourselves with that result.

So by including the word "reasonably" in there, we think we are trying to achieve a relative and reasonable balance between the need to protect the environmental and wildlife values of the area but not destroy the economic efficacy of oil and gas production projects.

Senator MURKOWSKI. On the idea of exploration, winner only, can you tell us a little bit about what the anticipated life of the field is, assuming that the reserves are there, as your geologists have indicated, and what would be left after the field was economically exhausted?

I am interested in knowing what kind of a footprint we could expect and roughly when it would likely occur, and is there any other conceivable development scenario associated with the 1002 area?

Mr. HORN. First of all, on that question I do not anticipate any other level of development. I do not think it is a place where recreational homes or theme parks will make much of a dent.

Our predictions would be that if we were fortunate enough to find 3 to 4 billion barrels of oil, we are looking at a production lifetime of maybe 30 to 50 years.

The actual footprint on the environment would be in the vicinity of 12,000 acres actually disturbed.

We have proposed as one of our stipulations that rehabilitation and restoration be a requirement of the program.

So basically, if you have the discoveries, you bring on line 3 to 4 billion barrels of reserves that you produce over 40 or 50 years, and the field peters out, tapers out, at that point you basically pick up the facilities and begin to engage in restoration and rehabilitation.

There, it is a question of just how long does it take to bring back that particular part of the state. Depending on the level of impact, you may bring back some areas in 10 to 15 years. Other areas may take 50 years to revegetate, and then you have to look at some of the cost questions. Do you pull out all the gravel pads, et cetera.

Senator MURKOWSKI. What does the industry tell you when the suggestion is that we allow leases for exploration purposes only but we want a chance to take a look at it if, indeed, there is oil there or to at least readdress the decisionmaking process, depending on whether or not there are recoverable reserves there?

Would this reduce the lease sale dramatically?

Mr. HORN. The answer we have gotten is that anybody who committed their company's assets to plunk down $40 or $50 million to drill an exploratory well with no prospect of return if a discovery was made might have a good time with their shareholders at their next annual meeting.

Senator MURKOWSKI. My last question concerns the Mineral Leasing Act and the specific 90/10 distribution which is covered under there and your evaluation of the terms and conditions under which the State of Alaska accepted statehood and the realization that that provision is covered in the Statehood Act.

From the standpoint of your position as guardian of the public treasurehouse, so to speak, might you indicate what position you would anticipate the State of Alaska might have legally if, indeed, there was a change proposed in the current 90/10 formula?

Mr. HORN. I think it is our opinion that the State's legal claim would not be a strong one.

Senator MURKOWSKI. A deal is not a deal, then, with the Federal Government?

Mr. HORN. They may have an equitable claim. I do not think they would have a legal claim.

Senator MURKOWSKI. Statehood is not a binding contract, then?

Mr. HORN. Well, it has been litigated that the Statehood Act is not really a binding compact, per se, and that Congress does have the authority to make some alterations in it.

Besides that, it is not really changing the Statehood Act. The Statehood Act says that where Congress leases under the Mineral Leasing Act, it is 90/10. If Congress chooses to lease under some other authority, like it did in NPRA, it can set whatever revenue standard it wants.

That is one of the reasons we have recommended stand-alone leasing authority and not an extension of the Mineral Leasing Act in this particular case.

Senator MURKOWSKI. Thank you.

Mr. Chairman, the only other comment I want to make is that the witness has not mentioned the potential of gas reserves, and I think it is important for the record to note that of the 192 trillion cubic feet of proven reserves that we have, 26 trillion were found in Alaska, not in the exploration of gas but incidental to the search for oil.

That gas is yet to be marketed and yet to have any developed scenario other than the realization that it is there, but I assume that there is the same application of probability in ANWR for gas discoveries while searching for oil.

Mr. HORN. Yes, sir. Frankly, you brought the gas factor in.

The CHAIRMAN. We are getting way behind on time, so with that admonition I will recognize Senator Bradley.

Senator BRADLEY. Thank you very much, Mr. Chairman.

Mr. Horn, in a letter dated June 1, 1987, the Environmental Protection Agency harshly criticized the 1002 report. It said, "EPA found the document incomplete in its presentation of scientific data that would support the impact conclusions and the Secretary's recommendation."

Under these circumstances, EPA acknowledged that normally it would "recommend that a revised document be prepared".

In S. 1217, we are essentially saying no further studies, reports or assessments shall be required prior to leasing.

My first question to you is do you have any suggestions or any comment on that recommendation? Are you confident that all adequate information or data have been used to minimize the damage or possible damage from development?

Mr. **Horn**. We think that there is sufficient information contained in the legislative EIS for Congress to make the decision it chooses.

It has been our position from the outset that once Congress had made the decision to open the area up, in order for us to go ahead with any subsequent lease sales we would do site specific EIS's on any given lease sale.

Frankly, that was a misunderstanding that EPA had with our position. The LEIS is a generic, programmatic policy document, and the type of information that they said was not present, where do you get the gravel, where do you get the water, how do you tailor things on the ground, we said we cannot answer those questions until we get to the lease stage. We cannot answer those questions until we know who gets what lease and who wants to build their gravel pad where.

We think that it would be appropriate, and the Secretary has reiterated many times, that if we get the authority we intend to prepare specific environmental impact statements and comply with NPRA on at least the first lease sale and then deal with NPRA on the subsequent lease sales.

Senator **Bradley**. You have made some lease sales in the Beaufort Sea; is that correct?

Mr. **Horn**. Yes, sir.

Senator **Bradley**. How much area has been included in that, and how much has been leased by the oil company?

Mr. **Horn**. I would have to provide you with those numbers for the record. It has only been a fractional portion of the aggregate area that has been offered.

Senator **Bradley**. Will an environmental impact statement cover these areas?

Mr. **Horn**. Environmental impact statements have been prepared before each and every Beaufort Sea OCS sale has been held.

Senator **Bradley**. EPA also notes that there were no cumulative effects evaluated in the 1002 report.

My question to you is do you think that that is wise? Has there been a systematic analysis of the overall impacts of leasing, not just in the ANWR area but also offshore and how that might affect the area?

Mr. **Horn**. I would disagree with EPA's conclusion.

We pointed out to them that we did engage in a cumulative effects analysis; that we did have cross-references to the Beaufort Sea OCS EIS's that were completed; and that we sat and talked to MMS, which is the division of the Department that runs the OCS program.

They have worked with the Fish and Wildlife Service on this whole question of cumulative effects. Some can argue it that maybe we did not cover it out to the Nth degree because I did not think we wanted to engage in rank speculation, but we have a process internally that we would prospectively intend to employ and that we have employed in the past to have BLM, Minerals Management and Fish and Wildlife work together to assess the aggregate impacts of Beaufort Sea and 1002 operations.

Senator **Bradley**. So your argument is you do have cumulative impacts considered both onshore and offshore?

Mr. **Horn**. Yes, sir.

Senator **Bradley**. S. 1217 directs the Interior Secretary to provide impact aid to assist in alleviating some of the social problems that flow from this for Native American culture.

What is your position on such aid?

Mr. **Horn**. We would be essentially opposed to that type of provision. Most impact aid is related to the situation of Federal facilities and relates to provision of financial benefits primarily in the educational field.

We think that if impact aid is warranted, if there are to be impacts or effects on North Slope communities, the State of Alaska can deal with that out of whatever percentage of revenues they may acquire from the leasing in ANWR.

Senator **Bradley**. So you oppose that part of S. 1217?

Mr. **Horn**. Yes, sir.

Senator **Bradley**. Even though you oppose it, could you give us any thought as to what would be if it was in the bill the best way to be implemented and how the funding mechanism be devised?

Mr. **Horn**. We would have to get back to you for the record.

Impact aid programs are not something which I deal with very regularly. I could not give you an answer at this time.

[The information follows:]

We believe that "impact aid" is not necessary or appropriate with respect to oil and gas activities carried out in ANWR. In general, oil and gas activities have a positive effect on the economies of local communities. Accordingly, we oppose any requirement for Federal financial assistance. If assistance is thought to be necessary, we believe that it should be administered and funded by the State of Alaska.

Senator **Bradley**. Okay, what about hunting fish and game? That is not allowed at Prudhoe Bay?

Mr. **Horn**. That is correct. That is a matter of State regulation.

We have proposed among our 29 stipulations that restraints be imposed upon hunting and fishing activities within *x* distance of pipelines, roads and facilities, and that people not be permitted to engage in hunting and fishing activities, except for local residents, let us say, of Kaktovic, so that we do not have a sudden influx of hunting and fishing pressure from people coming into the oil facilities.

Senator **Bradley**. You do believe that subsistence hunters should be allowed to continue to hunt in this traditional hunting area?

Mr. **Horn**. Yes, sir.

Senator **Bradley**. In the 1002 report, you list 26 geological structures that potentially hold oil and gas. Could you rank the potential of these structures?

Mr. **Horn**. We have ranked it by a geographic grouping.

Let me point out that 26 structures is the minimal number. There are a number of other areas in there that could have the potential for subsurface things such as stratigraphic traps which could also hold significant quantities of oil and gas, but our 3 by 6 seismic grid was not sufficiently fine to permit us to map those. So that 26 is a minimum number.

The two most important areas are, if you look on the maps, labeled as structures 18 and 19, which are east/southeast of Kaktovic.

That area and the structures down in the Jago River area, which I think are 20 and 21, those two groups of areas have about 75 percent of the potential.

Senator **Bradley**. Are you saying you cannot rank them?

Mr. **Horn**. We have ranked them by groupings, and the report, if I can find the section, has broken the coastal plain into three blocks: A block, B block, C and D blocks, and it ranks those blocks by potential.

Senator **Bradley**. Would it make sense to lease them in that order?

Mr. **Horn**. That is something that we are not prepared to answer at this time. That is the type of decision that we would make going through the NPRA process on a lease sale, which would be which areas you offer first, how much acreage, and what sequence.

Senator **Bradley**. So you are saying you want to defer that decision?

Mr. **Horn**. Yes. We think that it is something that demands an awful lot of intense scrutiny after we know what the basic groundrules are for opening the entire area.

Mr. **Cason**. Senator, one other thing you might find there is the industry may find that they have different priorities than we do in approaching this, and that their interpretation of the seismic data may be different than ours.

Senator **Bradley**. One other question relates to the draft 1002 report. That made some quite different assessments on the impact of wildlife than the final report. The draft report states a 20 to 40 percent decline in caribou, 20 to 25 percent decline in distribution of musk oxen and a reduction of wolf, et cetera. Reference to these estimates did not appear in the final report.

In addition, EPA notes the final lexis is inconsistent in its application of impact definition.

Also, EPA comes with the revealing statement that impacts are in many cases downgraded from the draft lexis without any explanation or justification.

Do you have any explanation?

Mr. **Horn**. It is very easy. Let me deal with just a couple of the examples to demonstrate.

The draft report contained, first of all, an editorial error in which we were discussing the displacement phenomenon with calving female caribou. It is very clearly understood that they are just a bit more sensitive than the other animals, and they will generally move away from half a mile up to 2 miles away from sites of human activity to drop their calves.

That level of displacement itself has been considered a major activity even if it has no impact on population dynamics or calf mortality. We wanted to quantify the impacts to the degree that we could, and so the draft report talked about if you had development in certain areas and if in one of those years out of 15 a chunk of the herd moved into that area and that portion of the herd had to move a mile or so away, you could in some years end up with 20 to

40 percent of the pregnant cows having to move half a mile to 2 miles to avoid human activity.

That 20 to 40 percent dropped the comma out of the sentence and led people to believe that the 20 to 40 percent displacement equaled the 20 to 40 percent population decline. The day the draft came out, we discovered the error. I can remember sitting in Ottawa telling the Canadians that. I said that at the press conference when I announced the draft report.

We made it clear from the outset, but a lot of people have continued to say, ah, a 20 to 40 percent decline. It was a 20 to 40 percent displacement.

When we got to the final report, we kept pressing. Let us make this thing as accurate as possible. Our biologists concluded that there were so many ifs attached to getting to that 20 to 40 percent displacement prediction that it was a speculative number, not a predictive number.

So we took the number out, but the report still acknowledges that location of facilities, if that is an area that a caribou wants to go to calve in, she is going to move away from it. We have acknowledged that. That is still in the report.

Senator **Bradley**. One of the concerns is on mitigation of adverse impacts, and in the final report—I forget exactly what page—you have a list of the mitigation measures. It is around 160.

Mr. **Horn**. On page 167.

Senator **Bradley**. You have a list of mitigation measures. Would you have any opposition if that list was included in the law?

Mr. **Horn**. It is our opinion that a list with that type of specificity need not be in the law, that those are the types of things that we intend to employ in putting together a program if we get the authority to protect the environment.

Obviously, if Congress, I think, in the legislative history made some reference to this list as the types of things that you all were interested in, we think that would be highly and wholly appropriate. But I think to get to that level of specificity in the statute I think is going to create problems down the road.

Senator **Bradley**. One final question, and that relates to when drilling could occur. It is your sense that it would occur in the winter?

Mr. **Horn**. Absolutely. One of the requirements we have outlined would be to limit exploration activities basically between November 1st and May 1st. That is traditionally when it has been done up there. That is when the seismic work was done that helped us produce this report.

That is the time, of course, when the animals, with the exception of the musk oxen, are long gone.

Senator **Bradley**. You would not object to the legislation stipulating that?

Mr. **Horn**. There again, that is something that there may be a particular case where somebody starts drilling a well in an area that is not frequented by wildlife, they want to go down to a certain depth, they have got another 1,000 feet to go when we get to May 1st.

Obviously, it might be appropriate, because there is nothing around, they are not adversely affecting anybody, to let them drill until the middle of June. That is the type of flexibility we think is important for a cost effective program to stay in place, but obviously putting those types of time frames on the statute would cause problems.

Senator **Bradley**. But basically, you oppose the mitigation measures in the final bill, and you would also oppose the winter-only drilling in the final bill?

Mr. **Horn**. No, I think what we are talking about here is how specific and precise does the statutory act get that lets us go. And I think that these are the types of things we would intend to do, and I think that some recognition of this by Congress is wholly appropriate.

But to pick up this level of detail in an area and put that into the law I think——

Senator **Bradley**. So you would oppose it being in the final law?

Mr. **Horn**. Right.

Senator **Bradley**. Thank you, Mr. Chairman.

The **Chairman**. Senator Evans.

Senator **Evans**. Thank you, Mr. Chairman.

I hope I do not continue to beat the same horse, but let me read certain sections of this bill, when taken in conjunction one with another, then try to get your opinion as to what you think is required by the bill and what you intend to do as a result of those requirements of the bill.

And I am speaking now of the exploration phase of a program, not the development or the production or the transportation phase, but merely the exploration phase, which will come first.

In one section of the bill it says, in reference to coastal plain resources, the 1002 report, "that shall satisfy all legal requirements under those laws with respect to any action taken to develop rules and regulations or procedures for competitive oil and gas leasing program."

It goes on further to say: "No further studies, reports, or assessments shall be required before the Secretary or other appropriate Federal officials may take action."

Then it goes on in the next subsection and says: "Nothing in this act shall be construed to affect the applicability of NEPA to phases of oil and gas development, production, and transportation conducted subsequent to initial leasing." So it leaves out exploration.

And then it goes on further to say: "Consistent with the general authority of the Secretary as described in section 288(a) of this Act, all Federal and State environmental laws of general applicability to oil and gas operations shall continue to be applied." "All Federal and State environmental laws of general applicability."

Then you read section 288(a), and it says: "This Act shall be considered the primary land management authorization for all activities associated." And it goes on to say "No land management review shall be required, except as specifically authorized in this Act."

Now, I am not quite sure where that puts us. You read those all in conjunction, it seems to me in the one section it says that NEPA is required, and all Federal and State environmental laws of general applicability should continue to be applied. That presumably would be for both the exploratory as well as the other phases.

Then you turn to the section it refers to and it says that no land management review shall be required, except that specifically authorized by this Act.

I think from reading all of that, although it seems to me there is some confusion in it, it ends up in terms of exploration with a proviso at the beginning of subsection (b), where it says "Prior to conducting the competitive oil and gas leasing sale pursuant to section 288(a), the Secretary shall promulgate such stipulations, regulations, and rules and regulations as he determines are necessary and appropriate to ensure that oil and gas exploration is conducted."

And it goes on to talk about the reasonable protection of fish and wildlife, which you have spoken to.

In your view, does taking all of those in conjunction one with another and the way the Act is worded now end up with the only new requirement on the Department at this point for an exploration program is for you to promulgate such stipulations, rules, and regulations as you determine necessary?

Mr. Horn. The way we understood it was that we could conduct a first lease sale without having to do a new environmental impact statement, and basically from that point forward we would be then operating under the normal rules and procedures that we have, and the other things and other agencies and Corps 404 permits, EPA stuff, would basically remain in full force and effect.

We had some questions about what the effect of section 4 was, and I spoke to that in my statement and said that we would like to make sure that that statement would be amended in such fashion to provide that basically all other State and Federal laws remain in force and effect in this area.

We do not think it is appropriate—we do not want any types of waivers from State law, for example.

Senator Evans. Well, even at the exploratory level?

Mr. Horn. That is correct.

Senator Evans. If you say that, and if we go back and incorporate that in there, instead of the proviso that no land management review shall be required unless specifically authorized, then you return to all Federal and State environmental laws of general applicability. You have put that in there.

Does that not automatically trigger a full NEPA requirement for the exploratory phase?

Mr. Horn. It may.

Senator Evans. It may, but what are you recommending? Should it or should it not?

Mr. Horn. I am saying that the state of current law is it may. In other words, if we have issued a lease and someone comes to us and says, we want to drill a well this winter under the stipulations and here is our plan, we then have to do an environmental assessment on that.

When we get done with the assessment, we do a thing called a FONSI. If we make a finding of no significant impact, that EA satisfied NEPA and we can issue the permit. If, however, we do the EA and determine that additional analysis is required, we then go to a full-bore EIS.

Senator **Evans**. Do you believe there is any chance whatsoever that you would get by with the finding of no significant impact without being taken into court?

Mr. **Horn**. It would frankly depend on how far down the road we were. If this were the first well, maybe not. If it were the fifth one that we did and they were all fairly close to each other, you know, nothing would be gained by beating that dead horse and doing another EIS on a track that is next to the one we just did.

Senator **Evans**. I think we are all talking about the first one. That has the most interest.

Mr. **Horn**. Our expectation is and the Secretary stated it would be his intention to do NEPA compliance and EIS on a first lease sale.

Senator **Evans**. Fine. Let me pursue just one other line of questioning which no one has so far. Do you believe that we have an adequate national energy policy today?

Mr. **Horn**. I do, sir. I think the administration has put one forward and it outlines the——

Senator **Evans**. Can you describe briefly for me what that policy is?

Mr. **Horn**. Well, energy policy is not in my realm. I will get my DOE book out here. I presume that a copy of this document has been provided to the committee at some time in the past.

Senator **Evans**. I have read it thoroughly.

I think there is a real question of what constitutes a policy. Policy is not just an accumulation of resources and expected needs. It has to be a lot more than that.

Mr. **Horn**. Well, I think it is an assured supply of energy at reasonable cost, and that is the simple thrust of the measure. And I think it is also understood that we cannot put all of our eggs in one basket, that the policy must try to properly balance. It has got a conservation component, a renewable component, a nonrenewable, which then would include coal, oil, and gas, nuclear, to basically put the energy policy on a number of legs, rather than just one.

And of course, that the primary motivation factor in the energy policy should be market forces, as opposed to the intervention of the Government.

I think that ANWR fits into this, very simply, because we as Federal land managers can take steps to prospectively augment our domestic reserve base. And right now, we are extracting domestic oil reserves faster than we are replacing them. And we all know that the consequences of not turning that around are going to drive our dependency levels well up over the mythical 50 percent mark.

ANWR is about the only place——

Senator **Evans**. Assuming there are no alternatives.

Mr. **Horn**. I think it is pretty clear in our mind that, just to give you a couple of the numbers, right now—and these are rough—we are consuming about 16 million barrels of oil a day.

We know that we are producing somewhere in the vicinity of 10. We also know that, unless we make major additions to the domestic reserve base, at the turn of the century, when we are really talking about ANWR oil, domestic production is going to be down in the 8 million barrel, and maybe even less than that, down to the 6 million barrel range.

Even if through conservation we can hold oil consumption dead steady, or let us say even bring it down a bit, assume we can drop it to 14 million barrels a day, reduce overall consumption while our population grows, with domestic production at 7 million barrels a day at the turn of the century we are 50 percent dependent, even if we have reduced raw consumption and even if we have managed to hold our production above where we currently augment it.

The only way out of that box that I see, that we see, is to make a significant addition to the domestic reserve base, so that that is coupled with—if we could reduce consumption to 14, non-ANWR domestic production 7, and we could bring another couple of million barrels a day on, that is the only way we keep ourselves from falling over 50 percent dependent.

I think ANWR fits in very well with the drive toward conservation. It demonstrates that conservation by itself cannot do the job, and hence that is one of——

Senator EVANS. And are you suggesting all of that, if we do not do something like this, that we would be in terrible, terrible shape?

Mr. HORN. I think that we all learned the lessons in 1974 and then again in the late seventies with Iran, what the consequences are of excessive dependence on imported oil in terms of the national security consequences and the hemorrhage of dollars going out; that I for one, not being an energy policy expert, have been persuaded by the facts that falling over 50 percent dependent on oil is not healthy for this country from its security or its economic perspectives.

Senator EVANS. And we should not have any problems at all in looking to the future in terms of competition from Japan, because they are 100 percent dependent, so they are going to collapse completely.

Mr. HORN. I do recall in working on the Trans-Alaska pipeline authorization bill, working in the House, that there was considerable concern in 1974, after the Arab oil embargo at how responsive Japan became to the OPEC nations and how unresponsive they became to us when their oil chain got jerked.

And that is a position I do not think it would be safe for us to be in. It is one that—as I said, I am not an energy expert, but I think any time that we are overly dependent on some foreign source for a primary commodity like oil, it is not in our Nation's wellbeing.

Senator EVANS. Let me just conclude by saying, what in your view does the national energy policy tell us about choice?

Does it tell us whether it is more important to go into ANWR or to pursue more aggressively offshore oil development? Does it tell us any priorities between those?

Mr. HORN. The Secretary has said that we have leased a fair portion of the OCS and unfortunately come up dry. But we have checked a lot of these areas that at the time were considered to have enormous potential and we have not found anything.

Senator EVANS. Does our energy policy tell us whether it is more fruitful to pursue more aggressively the utilization of methanol as a mix for gasoline as an alternative potentially to more oil?

Mr. HORN. I think the policy says that we have to pursue on the supply side a broad array of options. We need to be finding ways to make use of our coal. We have to add to our domestic reserve base because we are losing it faster than we replace it.

We have to deal with the nuclear equation. We also have to be looking for things, renewables, and get them from a fractional percentage to a greater contribution. And at the same time, we need to continue to make the dramatic progress we have made on the conservation side.

I can remember in 1973 when this debate was going on, U.S. oil consumption was 18 million barrels a day. It is now about 16. Our oil use dropped over the last 15 years. That is the type of progress we need to continue to make over the next 15 years.

Senator EVANS. To what degree——

The CHAIRMAN. Senator Evans, I hate to interrupt. We have four witnesses that we have to finish after this witness before 12:30.

Senator EVANS. Just one last question.

You mentioned that drop in oil consumption. To what degree do you think the phased standards had some role to play in that?

Mr. HORN. My understanding from what I have read and heard, the primary reason for the drop is the change in the market for oil, going from $3 a barrel up to $40 a barrel and now stabilizing at 20; and that the market responded and people switched to less costly fuels.

People just got a little bit more efficient about things over the last 15 years.

Senator EVANS. You are saying that our national energy policy is to do everything everywhere we can as fast as we can, without choice between them?

Mr. HORN. No. I think it is that we basically—we have got to let—the market is the most efficient mechanism for widening the conservation side of the equation, and that on the supply side we need an across the board approach so that we have an appropriate mix between oil and coal, electricity, electricity from renewables and nonrenewables.

And it has got to be—and we cannot put all of our eggs in one particular basket.

Senator EVANS. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Bumpers.

Senator BUMPERS. Mr. Horn, first of all let me say that I think you put the best face on the legislation and also on this whole proposal.

I do not think you have done so well answering to Senator Evans' question regarding energy policy in this country. And to pursue just what Senator Evans was talking about a moment ago, when you say the marketplace is what drives conservation, do you not agree that the so-called CAFE standards had a very dramatic impact on conservation in this country?

Mr. HORN. Mr. Chairman, I have got to tell you, I am not sure. Are those the automobile standards?

Senator BUMPERS. The fleet mileage standards for automobiles which we imposed on the automobile industry in 1975 and 1976, over their vigorous protestations, I might say.

Would you not say that that had been fairly successful?

Mr. **Horn**. I frankly am not in a position to judge. I would have to defer to someone else, but I would say that I know based on personal experience, having gone out and purchased cars in the seventies, I went looking for high mileage, low fuel consumption, not as a function of a Government standard, but because I did not want to pay a $1.25 a gallon to fill a gas guzzler.

So at least my personal response was market-driven.

Senator **Bumpers**. Well, we put CAFE standards in and the price of gasoline went to $1.25, and that sort of helped people's thinking about fuel efficiency in automobiles. And I do not disagree with that.

But let me just read you some statistics. Automobile efficiency—I am talking about fuel efficiency. Automobile fuel efficiency from 1973 to 1986 went from 30 percent—increased by 30 percent; trucks by 10 percent; aviation by 20 percent; high temperature process heat by 20 percent; low temperature process heat by 20 percent; lighting efficiencies have been improved 50 percent; domestic appliances by 20 percent; refining by 30 percent; and fossil-fired electric generation by 20 percent.

Now, let me read you another set of statistics to show what this administration has done since 1981. We have cut conservation research and development almost 50 percent. Coal R&D has gone from $729 million to $203 million.

Now, Senator McClure alluded to the totals in his questioning. I am giving you the specifics. Gas research and development has gone from $31 million to $8 million; oil R&D from $57 million to $25 million; solar and renewables, $822 million to $171 million—about a 300 percent cut.

And even nuclear, which this administration does favor, research and development has gone from a billion to $277 million. And magnetic fusion is the only one that has fared reasonably well.

So my question is this: If you find 5 billion or 10 billion barrels of oil in ANWR, the ultimate question is always going to be, when you talk about energy dependence, the question is always going to be what do we do for an encore, is it not?

You find Prudhoe Bay and now you tell us that by the turn of the century without ANWR we will probably be down to 7 million barrels a day domestic production, somewhere in that area.

Now, let us assume you find a huge quantity of oil in ANWR. By the year 2010 you are going to be looking at the very same statistics. And my point is, the ultimate encore is in alternative fuels and conservation. Would you not agree with that?

Mr. **Horn**. Absolutely. What we are in the process of is dealing with nonrenewables like coal and oil and gas, and looking to make the bridge from a current economy that is fueled primarily by nonrenewables to a date in the future where we can put most of our dependence on the renewable resources or resources that are not as relatively scarce or finite as oil and gas.

And I think that it took our forebears from the wood-fired economy of the 1850's about 50 or 60 years to make the transition after Mr. Drake made his discoveries in Pennsylvania, that it was a 50 or 60 year transition from a wood-fired economy to an oil-fired economy.

And we are probably looking at, if history is a guide, at another 30 to 50 years to make the transition from an oil economy to whatever happens to be next, and I will defer to the scientists as to what we come up with next.

Making discoveries in ANWR helps us bridge that gap. If we can bring in——

Senator BUMPERS. Let me interrupt you at that point. How do you bridge that gap by cutting the funding for every one of those things that you are going to bridge the gap to from $3.7 billion to $1.5 billion?

Mr. HORN. I think that is a simple question of tactics and the relative efficacy of Government programs. It is the administration's opinion that the Government programs are not exactly in the forefront and do not do the most efficacious job in bringing forward those types of new technologies, and that it is the private sector, the prospect of profits coming from finding some of these new alternatives, that that is where the driving force for bringing these things on line will come from.

Senator BUMPERS. Mr. Horn, we both believe in the free enterprise system. Even Deng Xiaoping and Mikhail Gorbachev are beginning to come around to that. We are not talking about the free enterprise system or the capitalistic system. Those things work very well.

But if you wait and you depend on that system and it turns out to be imperfect, which I think it does in this area to a large degree, then you find that you have waited too long to find that out and you find yourself in one whale of a predicament.

Now, let me ask you this. How do you account for the fact that as the price of gasoline went from $1.30 to .40 a gallon down to 90 cents a gallon, instead of maintaining the fleet averages on all of our automobiles, which have improved fuel efficiency so dramatically and are responsible—that single factor is responsible more than anything else for that decline in oil consumption that you have alluded to from 17 to 15 million barrels a day, and how do you accommodate that?

By administratively and by executive order, through Mrs. Dole and the Transportation Department, by reducing the CAFE standards and saying you do not have to comply with them any longer. Now what kind of nonsense is that?

Mr. HORN. I will have to ask the DOT people.

Senator BUMPERS. Well, it was not just Mrs. Dole's call. It is a question of policy.

Now, let me just say this, because I feel sorry for the chairman. He has to stay here after the rest of us have gone to lunch.

The CHAIRMAN. I have to leave at 12:30 and we have four witnesses.

Senator BUMPERS. Let me just say that I am an environmentalist and a conservationist, but I must say after visiting this whole Kaktovic and ANWR area, I am not as disturbed about the environmental disturbance there as I thought I was going to be.

It is a very desolate area. I am not unmindful or unconcerned about it. But I just came home not quite as concerned about it as I was when I went up there. But I am concerned about the idea of saying we have got to find more oil so Detroit can build bigger automobiles, so we can relieve them of further responsibilities to conserve energy and just act as though, no matter what happens, we are going to suddenly find some more oil some day.

And you and I both know that is not true. I am more concerned about doing this from an energy policy standpoint.

And let me ask you this question. Are you going to issue any leases in the Beaufort Sea?

Mr. **Horn**. We have.

Senator **Bumpers**. Off Kaktovic?

Mr. **Horn**. We already have issued some off Kaktovic.

Senator **Bumpers**. Has there been any drilling there?

Mr. **Horn**. I think we are getting the first permits in for drilling.

Senator **Bumpers**. If you have done that, that is fine.

Mr. **Horn**. We have already issued the leases. There are a number of them out there. I am not aware of anybody who has gone forward with any exploratory drilling on those tracts. But we will get right back to you on that.

[The information follows:]

October 28, 1987

LIST OF REQUESTS FROM SENATE ENERGY COMMITTEE HEARING
OCTOBER 14, 1987

1. How many Interior lease sales in the Beaufort area and how many are being drilled now? How much area is included in these lease sales?

Sale	Date	Acres Offered	Acres Leased	Leases Issued	Wells Drilled	Active Leases
BF	12/79	173,423[1]	85,776	24	7	22
71	10/82	1,825,770	662,860	121	7	107
87	8/84	7,773,447	1,207,714	227[2]	4	218

Currently there is no active drilling in the Beaufort Sea area. However, one application to drill is under consideration. If approved, drilling will commerce in early 1988.

Upcoming sales in the Beaufort area:

Sale 97, scheduled for January 1988.
Sale 124, scheduled for February 1991.

[1] This figure includes only Federal and Federally managed acres.

[2] Does not include 17 blocks in Sale 83 and 4 blocks in Sale 87 for boundary disputed areas receiving bids. No leases have been issued.

Senator **Bumpers**. Now, I keep reading in the paper that you say only 12,000 acres of land will be disturbed—I assume we are talking about roads and drill pads and housing and so on—and that no more than 1,200,000 acres would be leased. Is that incorrect?

Mr. **Horn**. It is 1.5 million acres is the entire 1002 area.

Senator **Bumpers**. For the 1002 area.

Mr. **Horn**. Yes, that is the entire extent of the 1002 area.

Senator **Bumpers**. The legislation is not confined to that, is it?

Mr. **Horn**. My understanding is that it is.

Senator **Bumpers**. If it is not, it would be agreeable to you to make certain that no more than 1.5 million of the 1002 acres would be leased?

Mr. **Horn**. Basically, the 1002 area is 1.5 million acres. That is all that we have talked about. The remaining portions all around the 1002 area are presently statutory wilderness, and we have no proposals to alter that at all.

Senator **Murkowski**. I would say to my colleague from Arkansas, it is confined to just the 1002 area, the bill that I have introduced.

Senator **Bumpers**. The bill is, thank you.

Could you give this committee and Congress a sliding scale computer model of how you arrived at the bonus bids of $2 to $4 billion?

Mr. **Horn**. Yes, sir.

[The information follows:]

The estimate was $2–4 *billion*. The model used for this analysis was a modification and synthesis of previously used models. The draft documentation of this model and methodology is attached.

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ARCTIC NATIONAL WILDLIFE REFUGE

PROPOSED EXCHANGE TRACT EVALUATION

ECONOMIC ANALYSIS DOCUMENTATION

Department of the Interior
Bureau of Land Management
Division of Mineral Policy Analysis and Economic Evaluation

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Prologue

In November, 1986 the Division of Mineral Policy Analysis and Program Coordination was assigned to review the data, models, and methodologies available to the BLM Alaska State Office to perform a satisfactory tract economic evaluation for the proposed exchange of oil and gas rights on the ANWR coastal plain 1002 area for prime wildlife refuge habitat on Alaskan native controlled lands within or adjacent to existing wildlife refuges in Alaska. The following three months brought an intense effort combining the skills and knowledge of dedicated Bureau staff in Alaska and Washington. This effort required adapting standard evaluation methodology to the requirements and data availability of ANWR; designing, implementing, and testing appropriate computer model modifications; investigating and selecting geologic and economic assumptions and inputs; and actual execution of the model to calculate the tract values for use in the exchange. This paper provides part of the final piece of the puzzle: the documentation of the economic model and its inputs. The documentation of the geologic and geophysical data is provided separately by the experts in the Alaska BLM office that conducted that work.

I. SUMMARY OF PRINCIPLE ECONOMIC ASSUMPTIONS

This section presents the principle economic assumptions that frame the analysis. These hopefully will answer 90 percent of the questions regarding the analysis. More detailed information is presented in later sections.

Discount Rate

A significant variable in any discounted cash flow (DCF) analysis is the discount rate. The rate used in this analysis was a 10 percent real after tax value. It is currently the usual onshore evaluation discount rate and is based on cost of capital and return on investment analyses. A more detailed explanation is available in the 1986 BLM *Guide to Oil and Gas Economic Evaluations*.

Recent cost of capital/return on investment studies demonstrate discount rates in the 8-12 percent range. Although it would be possible to randomly select over this range in the Monte Carlo analysis, it was decided in this situation that the mean of this result can be satisfactorily approximated by using the mean discount rate of 10 percent. Changing the discount rate generally will just scale the net present value (NPV) up or down. The NPV will sometimes shift between positive and negative values when there are large up front costs with large revenues in the distant future. However, in this analysis, the primary investment costs occur just before production starts. Production quickly escalates and then declines after a brief period at peak production. This concentration of production right after investment will generally not result in small changes in the discount rate determining whether or not a project is profitable.

Oil Prices

The wellhead price of ANWR oil is determined by projecting the crude oil price in the lower 48 and making certain adjustments to back off to the ANWR price.

The analysis assumed a mean lower 48 crude oil price in the year 2000 in $1986 of $32 per barrel. This is based on examination of forecasts by DOE and DRI, and on DOE's survey of oil industry expectations. Additionally, it is consistent with crude oil reserves.[1]

There is a wide range of oil prices in most forecasts. The 2000 DRI forecast range is $20-$50 per barrel. Due to the uncertainty of the price and its probability distribution, the analysis used a uniform distribution between $22 and $42 per barrel in $1986 in the year 2000.

The uncertainties increase as one goes further into the future. Due to the market forces that have manifested themselves so explicitly in the past 15 years, it can be expected that if there is a rapid increase in the balance of the century, it will most likely be followed by a slowdown in the increases after that. Conversely, increases in the low end of the range will probably be followed by more rapid increases. Rather than attempt to model all the cycle variations, it was determined to approximate this by emphasizing the possible variation in the next 14 years when the major decisions will be made and use a [illegible] percent per year real crude oil price increase after [illegible]

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[1] Oil and Gas Journal, January 5, 1987, p.27.

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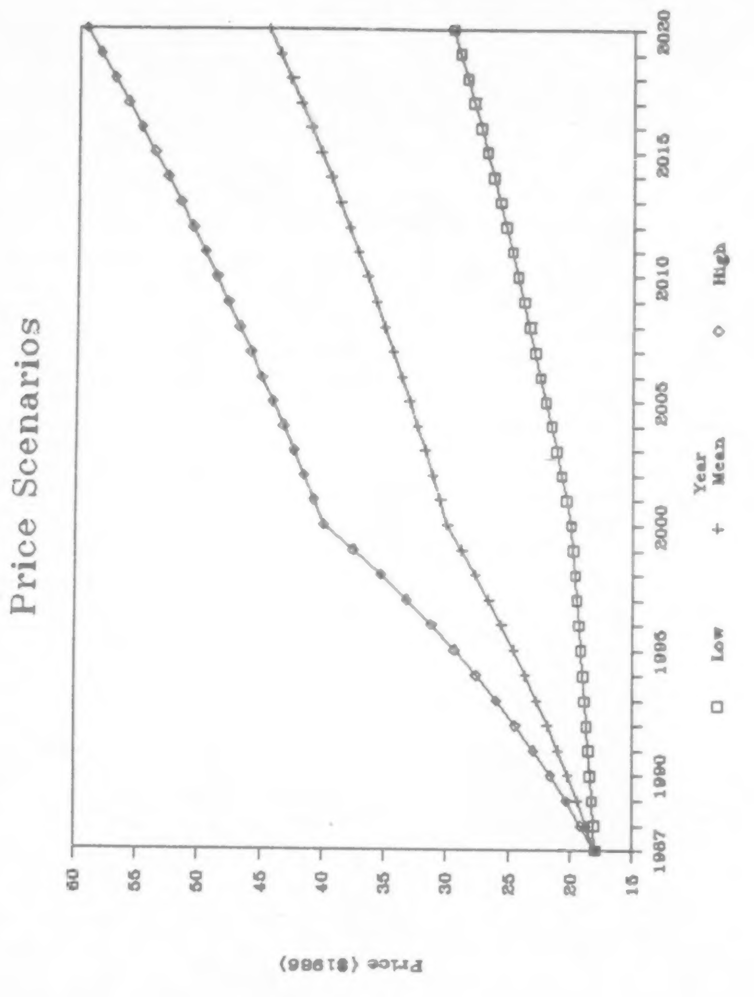

Price Scenarios

The lower 48 price was adjusted for the expected crude quality. A $2 price reduction to reflect expected lower North Slope crude oil quality was selected.[2] This results in a price range in 2000 ($1986) of $20 - $40 per barrel landed in the lower 48. Similarly the mean price is $30.

The approximate price range in selected years in $1986 is as shown to the left:

Year	Price Range
2000	20-40
2010	24-48
2020	30-60

To obtain the ANWR wellhead price, the transportation cost from ANWR to the lower 48 must be subtracted.

ANWR Crude Transportation Costs to the Lower 48

Crude transportation costs to the lower 48 are based on the costs derived for the BLM study cited above. The TAPS tariff estimate selected applies the FERC tariff methodology to annual TAP's throughput forecasts. These forecasts reflect the decline through time in Prudhoe and Kuparuk field production and increases and later decreases in neighboring field and ANWR production. The ANWR production for an iteration is estimated based on expected production from ANWR as a whole and the iteration reserves selection for the structure being evaluated. The ANWR to TAPS pipeline tariffs are based on a levelized cost per barrel using a similar ANWR production estimate and the distance from the structure being evaluated to TAPS pump station 1. Tanker costs to the lower 48 are based on weighted average costs to West, Gulf, and East coast refineries.

Natural Gas Economics

Due to the large existing levels of North Slope natural gas reserves and the current lack of transportation, natural gas discoveries are assumed to be uneconomic in the relevant timeframe. Gas is assumed to be used for reinjection and operations.[3]

ANWR exploration, Development, and Production Costs

Early to mid 1980's Alaskan North Slope mean exploration, development, and production costs, (adjusted to $1986), are used for the evaluation. These are higher than current costs due to the reduced level of activity. Development of ANWR assumes a significant increase in activity, thus the higher costs are used. These are based on costs reported by National Petroleum Council studies, Alaskan state studies, and oil exploration firms active in Alaska.[4]

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[2] See Economics of Oil and Gas Production from ANWR for Determination of Minimum Field Size, BLM, Alaska, 1986.

[3] Ibid.

[4] [illegible]

ANWR Cost Ranges

The cost variation for exploration, development, and production was assumed to be a triangular distribution plus or minus 25 percent about the mean cost. Cost contingencies were selected separately for investment and production costs. This is common industry practice in uncertain investments such as ANWR.

Inflation

The average annual inflation rate over the estimated 40 year analysis period is assumed to be 4 percent. This is the approximate average annual inflation over the past 40 years. The actual analysis period will vary on a case by case basis depending on the economic cutoff year for each iteration for each structure.

Royalty

There would be no royalty paid the government under the exchange agreements.

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II. BASIC DESCRIPTION OF THE MODEL

This section presents a brief description of the GENDCF model. This model is a derivation of the GEN4 model previously used for a variety of purposes in BLM, and the structure oriented portions of PRESTO (Probablistic Resource ESTimates, Offshore). The basic structural changes to each model is described here as well as the main analytical flow. Details are presented in the following section.

Overall Flow

The overall flow of the model starts by calculating mean exploration costs and the net loss if the project is not developed. This net loss is the up front cost, including exploration, adjusted for tax writeoffs. One iteration is run through the DCF portion of the model using mean input values to obtain the mean After Tax Net Present Value (ATNPV) and an estimate of bonus for use in the tax calculations in the Monte Carlo analysis.[5] Then the Monte Carlo analysis is executed to obtain the value distributions of the prospect when it is "wet".[6] The expected value is calculated as the dry prospect risk times the net loss plus the wet prospect probability times the mean ATNPV from the Monte Carlo analysis.

A major change made to the GEN4 model was to merge in the PRESTO model to calculate the reserve distribution. As this uses distributions of several factors for up to five zones in each prospect, it was not possible to easily obtain the mean and standard deviation for the oil reserve distribution and the associated mean cost values without first executing the full random generation process in the PRESTO submodel. Thus the random generation of reserves was moved to the beginning of the process from the Monte Carlo step with the required values maintained for each iteration.

Generate Reserves Distribution

This describes the modified PRESTO model. The portions of the model with area and basin risks were stripped out, thus only the data for a single prospect is utilized at any one time.

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[5] For the exchange it was assumed that no bonus is paid.

[6] The term "wet" means any state of nature or the market not included in the "dry tract or prospect risk". This could mean a "show or better" as used in the oil and gas industry, or anything above a certain minimum field size. Care should be taken that in these situations the states covered by the dry risk and the reserve distributions are mutually exclusive. However, the dry risk could also be used to substitute for market risk, i.e. a situation where the resource cannot be developed and sold regardless of resources, prices, and costs selected in the Monte Carlo analysis. Useful when there is a market limited by demand and the market is indicated by [illegible]

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The model first calculates the conditional zone risks as:

$$\frac{(\text{zone risk} - \text{prospect risk})}{(1 - \text{prospect risk})}$$

for each zone in the prospect. PRESTO was designed to handle only up to three zones, this was modified to accept up to five zones.

The model then randomly generates zone hits[7] based on the conditional risks.

After all the zone hits are generated the model then generates reserves for each iteration. First the area for this iteration is generated. For each zone a check is made for a hit in this iteration. If it is a hit then a random number is selected to check for a gas zone. If it is an oil zone then the thickness and or recovery are randomly selected. The zone reserves are:

Zone Reserves = Area x Thickness x Recovery

When all zones have been checked, the iteration prospect reserves, area, and maximum depth of wet zones are saved for later use.

After reserves have been generated for all iterations, the statistics are calculated, printed, and passed to the mean iteration.

Mean Run Iteration

The mean run iteration calculates the same values as the Monte Carlo analysis described below, but using the mean input values. This is where annual production and cash flows are printed if requested.

Monte Carlo Analysis

For each iteration the following occurs:

- Retrieve random reserve, area, and depth selections.
- Calculate net loss if it varies with random variables (such as cost contingency factors).
- Perform the Discounted Cash Flow analysis.
- If ATNPV is greater than the net loss then development and production occur and the appropriate values are saved. If ATNPV is less than the net loss then the iteration value is the net loss and no production occurs.
- Values are allocated to prospect contours based on ATNPV and area selection.

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[7] A hit means that some hydrocarbons [illegible] could be [illegible] oil or [illegible] and may [illegible] to be economic [illegible]. Since these are conditional on the prospect being wet, at least one zone will be wet on each iteration.

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Discounted Cash Flow Analysis

- Annual transportation costs are calculated based on the reserve pick, the prospect distance to TAPS, and the expected production from other ANWR prospects.
- Calculate the physical time limit based on the production distribution.
- Randomly generate cost contingencies for investment and operating costs, and annual prices at the wellhead.
- Calculate annual production, revenue, operating cost, and severance taxes.
- Calculate economic end of production as the last year that marginal revenue is greater than or equal to marginal cost.
- Calculate annual investment costs, depreciation, amortization, reclamation costs, and property, state, and Federal taxes.
- Discount cash flows to calculate ATNPV.

There are additional calculations in the model that are not shown here as they were not applicable to the ANWR analysis (royalty, depletion, windfall profits tax, etc.).

Costing of ANWR Development

For the analysis of the ANWR tracts, region-specific costs were derived for all phases of the oil operation. Information was obtained from many sources, including the National Petroleum Council's study of U.S. Arctic Oil and Gas (1981), discussions with industry, and current literature. This cost data, which included information on other North Slope projects, was used as a basis for defining cost curves that were used to estimate costs for developing and producing oil from projects in ANWR. Much of this data had been assembled for the economics analysis for the 1002 report to Congress.[8] Without the work done for that report, this analysis could not have been completed in the short time frame necessary. The modifications made were mostly to meet the additional requirements of the Monte Carlo analysis and some updated assumptions.

The oil projects that were analyzed were assumed to consist of several distinct phases, each with its own corresponding costs. Costs for each period are determined independently and may be a function of different variables. The progression of events that is assumed for these analyses is clearly illustrated in Figure 2. One can see that the project consists of four phases, with overlap occurring in the last two. Exploration drilling begins one year after acquisition and is used to determine the extent and economic viability of oil

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[8] Economics of Oil and Gas Production from ANWR for the Determination of Minimum Economic Field Size, John S. Young and William S. Hauser, Alaska SO, [illegible].

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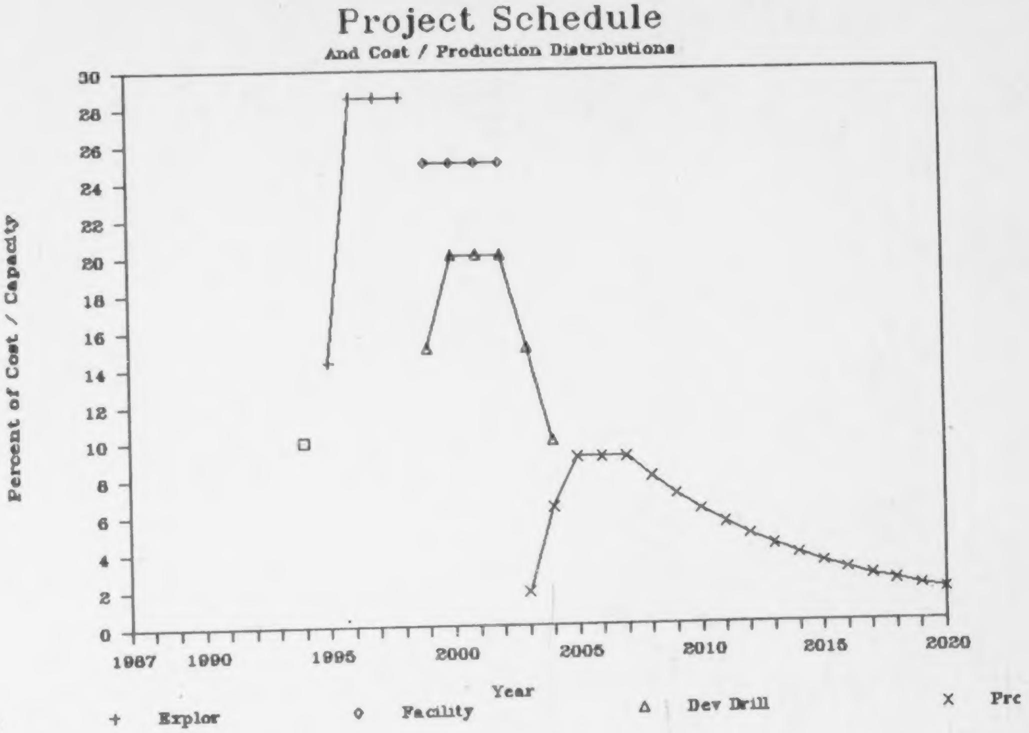
Project Schedule
And Cost / Production Distributions
Percent of Cost / Capacity
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1987
1990
1995
2000
2005
2010
2015
2020
Year
+ Explor
◇ Facility
△ Dev Drill
× Prc

reserves. An exploratory well is drilled in the first drilling season with two delineation wells drilled in each of the following three years if the exploratory well indicates the likely occurrence of economic oil reserves.

After the exploration and delineation period ends, the development period begins. This period includes both development drilling and the construction of production facilities. Production facilities require four years to complete after which production may begin, while development takes six years, thus overlapping production by two years. Production begins after the ninth year of the project and continues until all reserves are expended. Two distinct costs are associated with this phase. The first of these is the operating cost that is incurred each year that oil is produced. The second component is transportation cost, which allows for the movement of oil from the wellhead to the market. Both costs are incurred only when there is production. The final cost that is considered in the analysis is reclamation cost. This expense, which occurs at the end of production, "cleans up" the project. It is incurred in one year only, at the end of the project.

In the analysis, costs were assumed to be constant in real dollars over the life of the project, (i.e., costs increased with inflation). For tax purposes tangible and intangible fractions of all investments are defined and are treated consistent with the latest Federal tax code and Alaska state tax code.

Exploration Costs

The first cost that will be calculated is the exploration cost. The resultant value will represent all costs associated with exploration drilling including reclamation. These costs are calculated for every run; it is during exploration that it will be determined if the structure and each of its zones are either wet or dry. The components of the exploration cost are the cost per well and the total number of wells. The first of these, exploration drilling cost, is a function of well depth. Using information obtained from industry, current literature and past drilling on the North Slope, a curve was derived showing the relationship between the cost per well and well depth (Figure 3). These costs reflect a curve that incorporates past experience on the North Slope and applies it to ANWR. The exploration costs used in these evaluations do not represent those originally encountered on the North Slope; instead it considers the experience that was gained there and adjusts cost estimates accordingly. Costs are specified as a function of depth. Well depth is equivalent to the deepest zone in the structure (which is an input to the PRESTO part of the model). This depth will remain constant for all wells drilled for that prospect.

The second component, which is the total number of exploratory wells that will be drilled for each project, is dependent upon the discovery of oil. For all evaluations, one exploratory well is drilled in the first year. If economic oil is not found then the prospect is abandoned and no additional wells are drilled. If sufficient oil is found, six delineation wells are drilled over the following three years. Thus, if oil is "found" then a total of seven exploration wells will be drilled over the four year exploration period.

If exploration shows that the structure is dry or uneconomic, no additional [illegible]
[illegible]
cost. If exploration [illegible]
the development costs for that project and continue determining costs for the project development.

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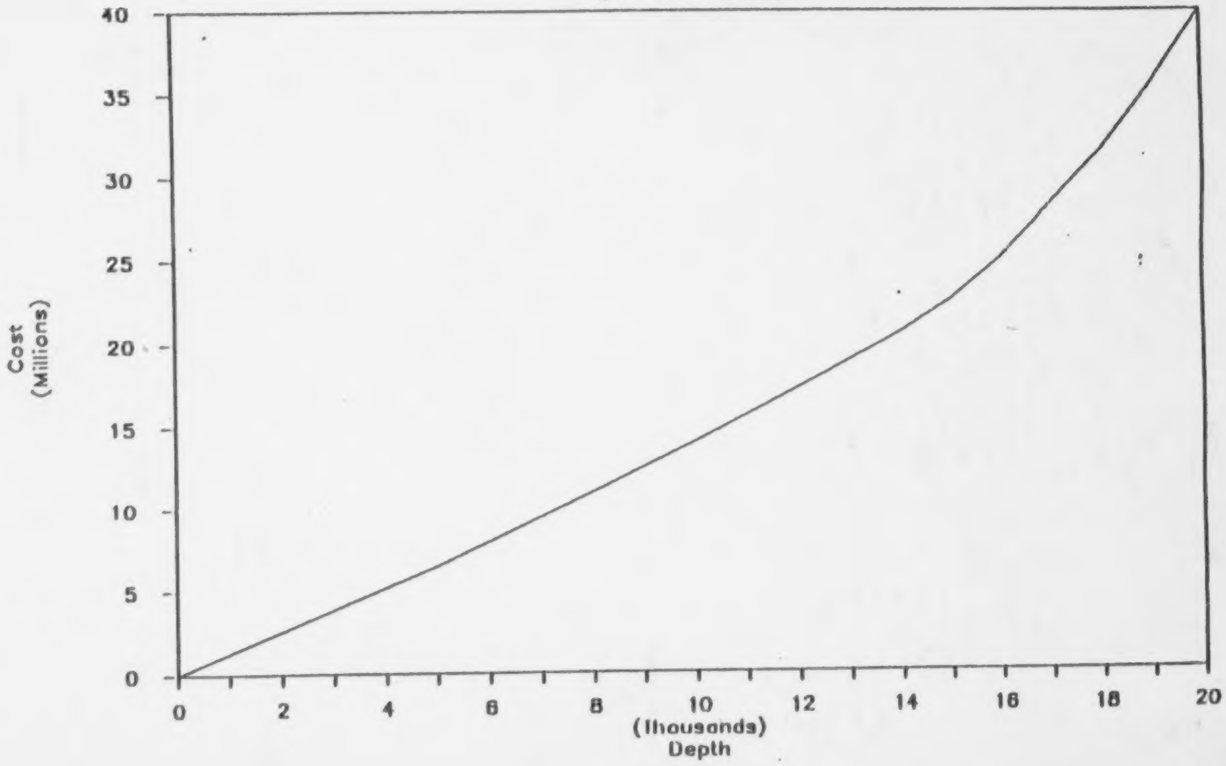
FIGURE 3

EXPLORATION DRILLING COSTS

(1984 DOLLARS)



Source: Bureau of Land Management estimates

Development Costs

Development Drilling

Development costs consist of two distinct components -- these are development drilling costs and production facilities costs. Total drilling costs are a function of the depth of the wells and the number of wells that must be drilled. The depth of the development well is determined during exploration and is equivalent to the deepest zone of the structure that is determined to be "wet". The cost of each individual well is linearly related to this depth (Figure 4). All wells that are drilled during development will be of the same depth. These drilling costs do not include the cost of reclamation. Because the wells will be used as production or injection wells later in the project, the cost of reclaiming them will be included at the end of the project life.

The second determinant of total development costs, the number of wells, is a function of the productive acreage (determined in the PRESTO portion of the model) and the well spacing. For all evaluations of ANWR tracts, an effective spacing of 114 acres/well was used. One production well is assumed to be drilled every 160 acres and two injection wells are drilled for every 5 production wells. By dividing the number of productive acres by the spacing (acres/well) one can determine the total number of wells that will be drilled during development. These will be drilled over a six year period with production beginning after the fourth year.

Once both the productive acreage and the number of wells have been determined, total development costs can be calculated. The total cost is determined by multiplying the cost per well by number of wells. This amount is incurred over six years and begins after the exploration period has ended. Fifteen percent of the costs are incurred in the first year of development, twenty percent per year in the second through fourth years, fifteen percent in the fifth year and the ten percent in the sixth year. The tangible fraction of this investment (thirty percent) is depreciated using a 5 year double declining balance with the midyear convention in the first and last years (i.e., depreciation is deducted over six calendar years). No salvage value is assumed for this expenditure.

Production Facilities

The second component of development costs is production facilities costs. This includes all facility costs for the project excluding well costs (which were discussed earlier). Items such as buildings, drill pads and a gas reinjection and water flood project are considered in this cost. Facility costs are a function of the peak production rate and, as can be seen in Figure 5, the cost per barrel decreases as peak production increases. These expenditures are incurred over a four year period, beginning after exploration has ended. They are equally distributed over this time. All of the investment is considered to be tangible and is depreciated using a five year double declining balance with midyear convention. No salvage value is associated with this expenditure.

Figure 4
DEVELOPMENT DRILLING COSTS
(1984 Dollars)

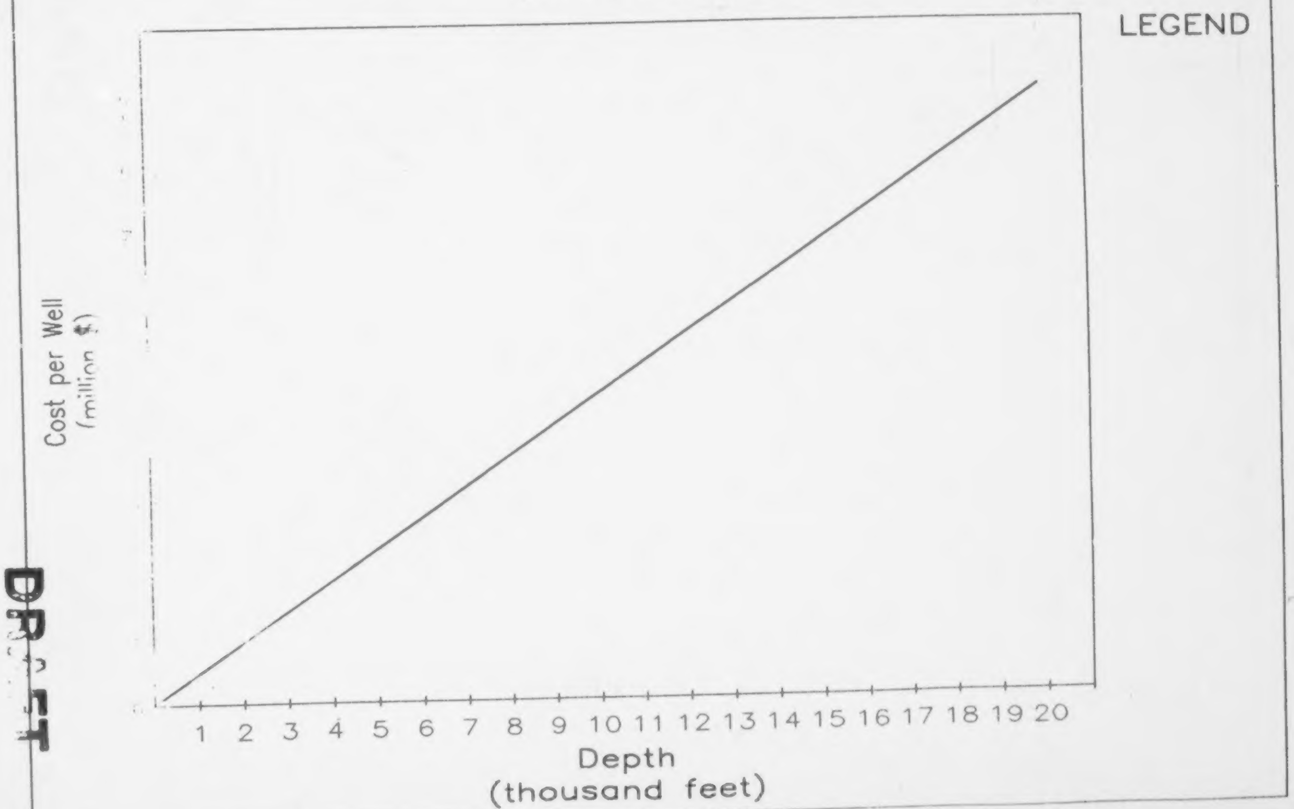


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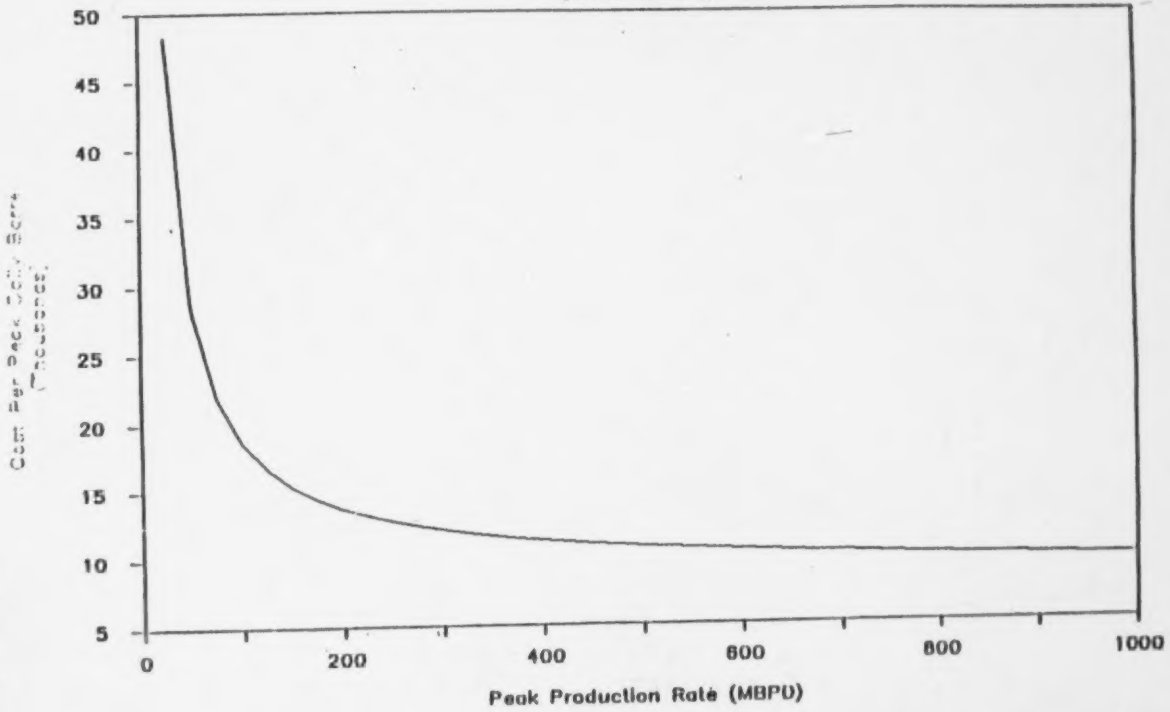
FIGURE 5

PRODUCTION FACILITIES COST

(1984 Dollars)



urce: National Petroleum Council (1981) estimates escalated to 1984 dollars using the Marshall Valuation Services (1985) index for petroleum equipment.

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Production Costs

Operating Costs

After development is completed, production commences. Annual production expenses are calculated separately and are a function of the annual production rate. The components of operating costs include labor and administrative costs, supply costs, overhead costs, and maintenance costs.

Annual operating costs are specified as a step function (Figures 6 & 7). Separate equations are defined for production less than 55 million barrels/yr., 55 to 110 million barrels/year, 110 to 365 million barrels/year, and greater than 365 million barrels/yr. As one would expect, operating costs/barrel diminish as production increases.

Crude Oil Transportation

The transportation costs to move oil from ANWR to market is described in detail in the previously referenced BLM study. The costs are broken into three segments:

1) ANWR to Pump Station 1 of the Trans-Alaska Pipeline System (TAPS),

2) Pump Station 1 of TAPS to Valdez, Alaska, and

3) Valdez, Alaska to Market.

The following summarizes the methodology used and the changes made to the 1002 analysis for the proposed exchange.

1) ANWR to Pump Station 1 of TAPS

The pipeline tariffs from ANWR to TAPS are calculated as the real levelized cost per barrel of oil that would yield a real after-tax rate of return of ten percent. The assumptions that were changed from the 1002 analysis are:

1. Pipeline throughput will be equal to field production plus the expected production from the other prospects in ANWR.

2. Updated tax calculations including new depreciation schedules, elimination of the investment tax credit, and a corporate income tax rate of 34 percent.

3. Costs and tariffs increase with the 4 percent average annual rate of inflation.

2) Pump Station 1 of TAPS to Valdez, Alaska

This calculation is the same as in the 1002 report except that the volume is based on the prospect production plus expected production from other structures. The projected TAPS tariff without ANWR production are reduced based on the [illegible]
[illegible]

3) Valdez, Alaska to Market

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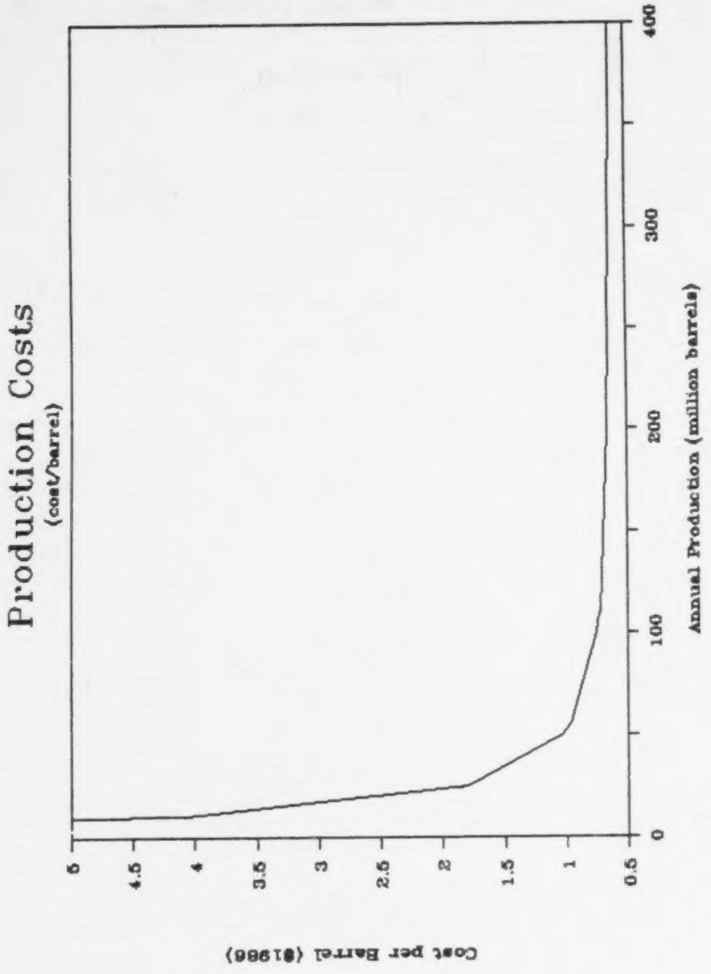
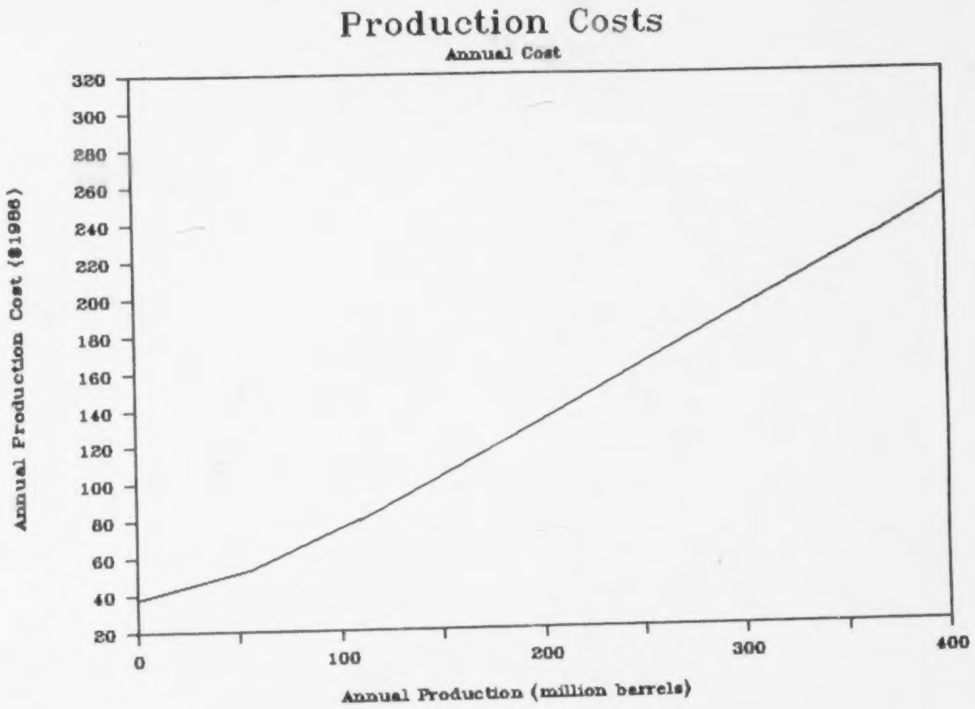

Production Costs
(cost/barrel)
Cost per Barrel ($1986)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
100
200
300
400
Annual Production (million barrels)


Production Costs
Annual Cost
Annual Production Cost ($1986)
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
100
200
300
400
Annual Production (million barrels)

This is based on the weighted average cast of shipping oil from Valdez to primary markets on the West, Gulf, and East coasts of the United States. This cost escalates with inflation.

Reclamation Costs

After production for the project has ended, one final cost remains to be incurred. This is for the reclamation of the project, which includes the plugging and abandonment of production wells, the removal and dismantling of all surface facilities, and other surface reclamation. In these evaluations reclamation costs are a function of the total capital costs incurred during the project. They are estimated to be ten percent of development costs (excluding exploration costs). The figures used are based on estimates by industry of the reclamation costs associated with a North Slope site. For these evaluations it was assumed that reclamation commenced in the final year of the project and took one year to complete.

Exploration Costs

For the mean iteration and the Monte Carlo runs the mean exploration cost is used for costs and tax write offs. The 1986 cost per well in ANWR ranges from $7,000,000 to $55,000,000. These costs escalate with inflation. The actual cost in input individually for each structure based on its deepest zone. The tax writeoff is the cost of one well times the Federal tax rate (34%). This is discounted to obtain the present value of the tax writeoff.

Mean/Monte Carlo Iterations

From this point the mean iteration and the Monte Carlo runs differ in that the Monte Carlo iterations randomly select from the specified distributions while the mean iteration uses the mean input values.

The first selection is from the reserves. The mean iteration uses the mean from the PRESTO submodel, the Monte Carlo iterations use the iteration values selected and saved in the PRESTO submodel.

Allocation of Values

The iteration values are allocated over the structure contours according to the productive acreage for that iteration. Tract values are allocated according to the mean structure contour values.

This completes the basic description of the model. A detailed description of the various components and the data inputs follows in the next section.

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III. DETAILED MODEL DESCRIPTION AND INPUTS

There are many options available in GENDCF that were not used in the ANWR analysis. The following discussion will focus only on those options used for ANWR.

Rate Conversion

The first step the model takes after reading all the input is to perform the rate conversion. All of the rate inputs are in real annual terms. This includes price increases, investment and operating cost increases, salvage and drilling cost increases, after tax return on equity, and borrowing rate of interest. Inflation is input in annual terms. GENDCF then converts all values to a continuous basis and adjusts the rates for inflation to go from a real to a nominal basis. The discount rate is a function of after tax return on equity, borrowing rate of interest, inflation, and the debt - equity ratio.

The model then proceeds to the PRESTO submodel to generate the reserves distribution.

Generate Reserves Distribution

The PRESTO model is designed to handle both oil and gas, but in this analysis gas was assumed to be uneconomic and thus ignored after discovery.[9] This discussion will involve only those parameters utilized in the ANWR analysis.

The model is run for one prospect at a time. The number of zones and the prospect dry risk are first input. For each zone the following is read:

- The zone dry risk,
- the probability the zone is all oil,[10]
- the probability the zone is all gas,
- and the following probability distributions:
    - the area in acres as a triangular distribution with the minimum, most likely, and maximum values,
    - the thickness in feet as either a triangular with the minimum, most likely, and maximum values, or a lognormal with a minimum and maximum,
    - and the recovery rate in barrels per acre-foot as a triangular with the minimum, most likely, and maximum.

---

[9] Note for future use of this model. Due to limitations at the time, and the large number of iterations on a single prospect with up to five zones, streamlining of the model that was done requires that additional modifications would be required to utilize gas and/or additional reserve parameters.

[10] For this analysis each zone is assumed to be either oil or gas so that these two probabilities [illegible]

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As presented in the general description, the model then calculates the conditional probabilities for each zone:

$$\frac{(\text{zone risk} - \text{prospect risk})}{(1 - \text{prospect risk})}$$

The model then loops through each zone for the number of iterations requested (for the ANWR analysis we used 1000 iterations), indicating for which iterations each zone was wet. From here the reserves can be calculated. For each zone and for each iteration that the zone was wet, a random sample from the binomial distribution of all oil versus all gas checks for oil or gas. If the pick is for oil, the model samples from the specified probability distributions. One exception involves the area parameter. As a simplifying assumption, each zone used the same sampled area for any particular iteration. Essentially this implies that each zone has the same fill-up, resulting in more straightforward economics calculations later in the process. The zone reserves are then calculated as:

Zone Reserves = Area x Thickness x Recovery

When all zones have been checked, the iteration prospect reserves, area, and maximum depth of wet zones are saved for later use.

After reserves have been generated for all iterations, the statistics are calculated, printed, and passed to the mean iteration.

Transportation Costs

The selected reserves are first used to calculate the transportation costs to move the crude oil from ANWR to market. The equations shown here are the result of the methodology presented in the General Description of the model. The prospect information input to the analysis are:

a) the distance from the prospect to TAPS pump station 1,

b) the total expected reserves for all of ANWR, and

c) this prospect's expected reserves (i.e. the portion of b) from this prospect).

The importance of the transportation costs required that the analysis be run several times for all of ANWR with subsequently more refined estimates of b) and c). Initially the conditional values from the 1002 analysis were used. The resultant expected values for each prospect and the total for all prospects were then input in the next round. This was repeated for the subsequent iteration which yielded estimates that did not change significantly from the input values.

The transportation calculation uses the total ANWR reserves expected for each iteration. The total expected reserves for all other prospects are b) minus c). This result is summed with the prospect's iteration reserves selection to yield the total [illegible] ANWR [illegible] then the iteration selected prospect [illegible] is the assum[illegible] probabilities for each prospect are independent of each other.

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The ANWR reserve figure is converted to millions of barrels for the following calculations.

The pipeline cost is:

$$\text{Miles} * 9.75 + \text{INT}\left(\frac{\text{miles}}{90}\right) * 190$$

Where: Miles = the miles from prospect to TAPS pump station 1
INT ( ) = the integer portion of the value in parentheses
i.e. Int(75/90) = 0, INT (100/90) = 1

The ANWR pipeline tariff is:

(ln (pipeline cost) - ln (ANWR reserves) + 1.3734)

Where: ln ( ) = natural log of value in parentheses

The TAPS tariff is derived by calculating the reduction to the estimated TAPS tariff that would occur with the volume added by ANWR. This reduction uses two different equations depending on the ANWR reserves. If ANWR reserves are less than or equal to 1750 (million barrels) then the reduction is:

-0.001867 * ANWR reserves + 0.96971

else the reduction is:

-0.16647 * ln (minimum of 5000 and ANWR reserves) + 1.88774

The second equation assumes that the rates will not decrease additionally for ANWR reserves greater than 5 billion barrels. The resultant TAPS tariff is obtained by multiplying the reduction value by the tariff estimate assuming no ANWR production.

The tanker charge is $2.55 per barrel

The total transportation cost is the sum of the ANWR pipeline tariff, the TAPS tariff, and the tanker charge. It is assumed that these costs will increase with inflation.

Physical Time Limit

The model next determines the physical time limit based on a peak annual production rate of 9.1 percent of reserves with a two year buildup of 20 percent and 70 percent of peak production and a 12 percent annual decline rate. The physical time limit is the number of years it takes to deplete all the reserves.

Development Costs

The next step is to calculate the cost contingency factors and the investment costs. In this analysis the mean contingency factor equals the most likely value of 0.0 (i.e. the cost multiplier is 1.0) with a minimum and maximum of -.25 and .25 respectively. Cost contingency factors are calculated for both capital costs and operating costs.

The capital costs are then calculated for facility costs and development drilling. Facility costs are calculated as:

$$\left(\frac{986.4}{\left(\frac{\text{peak production}}{365{,}000} \right)} + 8.768 \right) * \frac{1000 * \text{peak production}}{365}$$

and is spread over the 1st four years of development. Development drilling is:

$$\frac{\text{productive acres}}{\text{acres per well}} * \text{productive depth} * 450$$

Where acres per well is 114. The productive acres and depth are selected and saved by the PRESTO submodel.

Both of these costs are multiplied by the capital cost contingency factor.

Devel. Year	% of drilling costs
1	15
2	20
3	20
4	20
5	15
6	10

These costs are spread over six years of development as shown to the left. The facilities costs are considered all tangible and thus depreciated. The development drilling costs are 30% tangible and 70% intangible drilling costs (IDC's).

These IDC's can be 70 percent expensed with the remaining 30 percent amortized equally over 5 years.

Thus if FACIL represents the total facilities costs and DEVDRL represents the total development drilling costs, then the following cost streams result:

Year of Development	Depreciated Costs			Amortized Costs		Expensed Costs	
1	.25*FACIL+	.15	*.3*DEVDRL	.15	*.21*DEVDRL	.15	*.49*DEVDRL
2	"	.2	"	.2	"	.2	"
3	"	.2	"	.2	"	.2	"
4	"	.2	"	.2	"	.2	"
5		.15	"	.15	"	.15	"
6		.10	"	.10	"	.10	"

These costs are then assumed to increase with inflation.

Prices

The model next generates prices. As described in the summary of basic assumptions, the analysis assumes the real lower 48 market prices in 2000 for North Slope crude can be anywhere in the range of $20 - $40 per barrel with equal probability. After this the real price increase at 2 percent per year. This range of possibilities was shown in Figure 1. To obtain nominal prices, these increases are compounded with the 4 percent inflation.

The nominal wellhead price is the nominal lower 48 market price minus the nominal transportation cost. The nominal wellhead price is the price used in the balance of the calculation.

Production

The model builds the production streams through the physical time limit (i.e. full depletion). As described earlier this analysis assumes a peak production of 9.1 percent of reserves. There are two years of buildup, one 20 percent and the second 70 percent of peak. The peak production lasts three years, after which the decline occurs at the rate of 12 percent per year.

Gross Revenue

Revenue is simply production times wellhead price. It is assumed that the windfall profits tax does not apply.

Operating Cost

The annual operating cost is a function of annual production. Previously Figures 6 & 7 showed this function graphically. Below is the algebraic representation:

Annual production	Operating cost
<55,000,000	38,000,000 + .275 * annual production
55,000,000 - 110,000,000	26,000,000 + .495 * annual production
110,000,000 -365,000,000	15,000,000 + .59 * annual production
>= 365,000,000	.63 * annual production

These are the real mean operating costs. They escalate with inflation and are multiplied by the operating cost contingency factor.

Royalty

This analysis was performed assuming no royalties are due.

Rent

This analysis was performed assuming no rents are due.

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Severance Taxes

Alaska has two production taxes: the Conservation Tax and the Severance Tax. The Conservation Tax is $0.00125 per barrels of production.

The Severance Tax is the maximum of $.80 per barrel and a complex ad valorem tax. The ad valorem tax is based on a crude quality based production limit and economic limit factor (ELF). This analysis assumed quality comparable to Prudhoe Bay oil. Thus the production limit is

$$78204.9 * \frac{\text{productive acres}}{114} \quad ; \text{where 114 is the acres per well}$$

If the production is less than this limit then the $.80 tax applies, otherwise the calculation continues as described below.

$$\text{ELF} = \left(1 - \frac{\text{production limit}}{\text{annual production}}\right) * 1.533$$

In the first 10 years of production, if ELF is greater that 0.7 then it is reset to 1.0. In the first 5 years of production the ad valorem tax is:

$$0.1225 * \text{revenue} * \text{ELF},$$

else it is:

$$0.15 \text{ the revenue} * \text{ELF}$$

The severance tax is the maximum of the ad valorem rate and the $.80 per barrel.

Economic Cutoff

Marginal cost is the sum of operating cost, royalty, severance tax, rent, and windfall profit tax (WPT). Royalty, rent, and WPT were not used in this analysis. The economic limit of production is the last year in which gross revenue is greater than or equal to the marginal cost. This determines total years of production and total oil production.

Investment Cost Analysis

This section is where investment costs are escalated to obtain nominal values In this analysis all costs were escalated by general inflation. Also in this analysis only exploration and developments costs are utilized, there are no deferred costs.

Reclamation costs are estimated to be 10 percent of nominal tangible development costs. These costs are incurred in the last year of production as determined by the economic cutoff.

The cost recovery is done by expensing and depreciating. No costs are recovered by [illegible] expendi[illegible] [illegible] balance wi[illegible] the [illegible] year [illegible] (i.e. deprecia[illegible] [illegible] over [illegible] years). There is no salvage value for any of the investments.

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Property Tax

Alaska has a property tax of 2 percent of the value of property. Total property value in any one year is the sum of tangible investment. Over time this property is devalued in a straight line to the end of production. However, the value also increases by the rate of inflation. For example, consider a $1 million investment made with 10 years of production remaining and 4 percent inflation. Doing the calculation in annual terms results in the following:

Years of production remaining	Value	Property tax at 2 %
11	$1,000,000	$20,000
10	936,000	18,720
9	865,280	17,306
8	787,405	15,748
7	701,915	14,038
6	608,326	12,166
5	506,128	10,123
4	394,780	7,896
3	273,714	5,474
2	142,331	2,847
1	0	0

Tax Calculations

Royalty, rent, salvage value, advance royalty, depletion, reclamation tax accounts, investment tax credits, and windfall profits tax are not used in this analysis so the balance of this discussion includes only the remaining factors in the tax calculations.

State taxable income is gross revenue minus operating cost, depreciation, severance tax, expensed investment, and property tax. State corporate income tax is 9.4 percent of this value. Federal taxable income is obtained by subtracting the state tax from state taxable income. Federal corporate income tax is obtained by multiplying the resultant income by the maximum 34 percent Federal corporate tax rate. No calculation is made for the alternative minimum tax.

Working capital is estimated at 10 percent of operating cost. The net working capital for each year is the net change required to maintain the proper level of working capital. If operating costs increase, then the net is positive, if operating costs decrease, then the net is negative. In the last project year, working capital returns to zero.

Discounting Cash Flow

The after tax nominal cash flow is gross revenue minus total investment costs, operating costs, all taxes, and net working capital. The present value cash flow is obtained by discounting the nominal cash flow. After tax net present value (ATNPV) is the sum of the discounted cash flows.

The Development Decision

The development decision is based on the relative values for ATNPV and the net loss without development. If ATNPV is less, then development does not occur, production does not occur, and the only cash flows are those from the exploration well. Otherwise development does occur and all cash flows and production are saved. The annual cash flows are printed for the mean run, and for Monte Carlo transactions where the reserves selection is greater than 17 billion barrels.

This is the end of the Monte Carlo loop.

Allocate Prospect Values to Tracts

The values of structure are allocated over the whole prospect for exploration. This treats the structure as though it were unitized for exploration with all the lessees sharing that cost by acre.

Development iterations are allocated out to the structure contour reached by that iteration's productive acreage. The final contour value has the dry track risk allocated over all contours.

The following example should help better understand this calculation.

Total prospect area is 20,000 acres.

Contour acreage is:

Contour #	cumulative acres
1	5,000
2	15,000
3	20,000

Net loss from exploration is $10,000,000.
Dry track risk is 90 percent.

For each iteration the net loss from exploration is allocated over all prospect acreage. The remaining value is allocated over the iterations productive acreage. In our example, if the iteration ATNPV was $990,000,000 from 10,000 acres the value would be allocated as follows:

Contour	Net loss from Exploration		
1	$\frac{-10,000 * (5,000 - 0)}{20,000}$	=	-2,500,000
2	$\frac{-10,000 * (15,000 - 5000)}{20,000}$	=	-5,000,000
3	$\frac{-10,000 * (20,000 - 15,000)}{20,000}$	=	-2,500,000

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$$\text{Developed Value (total)} = 990{,}000{,}000 - (-10{,}000{,}000) = 1{,}000{,}000{,}000$$

zone all productive	1	$1{,}000{,}000{,}000 * \frac{(5{,}000 - 0)}{10{,}000} = 500{,}000{,}000$
zone partially productive	2	$1{,}000{,}000{,}000 * \frac{(10{,}000 - 5{,}000)}{10{,}000} = 500{,}000{,}000$
zone nonproductive	3	0

Thus for this iteration the contour values are:

1. 500,000,000 - 2,500,000 = 497,500,000
2. 500,000,000 - 5,000,000 = 495,000,000
3. -2,500,000

This is done for all 1000 iterations, then summed and divided by 1000 to get the mean value of the prospect is wet.

The expected value for each contour requires including the dry risk losses. Assuming that the mean contour values if wet are the following:

Contour	Mean value if wet
1	1,100,000,000
2	750,000,000
3	50,000,000

The expected contour values are:

Contour	Mean expected value
1	$.10 * 1{,}100{,}000{,}000 - .90 * 10{,}000{,}000 * \frac{(5{,}000 - 0)}{20{,}000} = 107{,}750{,}000$
2	$.10 * 750{,}000{,}000 - .90 * 10{,}000{,}000 * \frac{(15{,}000 - 5{,}000)}{20{,}000} = 70{,}500{,}000$
3	$.10 * 50{,}000{,}000 - .90 * 10{,}000{,}000 * \frac{(20{,}000 - 15{,}000)}{20{,}000} = 2{,}750{,}000$

The mean expected tract values are then allocated on a per acre from the contour values. If a 2,560 acre tract has 1,000 acres in contour 1 and 1,560 acres in contour 2, the tract value would be:

$$1{,}000 * \frac{107{,}750{,}000}{5{,}000} - 1{,}560 * \frac{70{,}500{,}000}{10{,}000} - 32{,}548{,}000$$

If a 2,560 acre tract has 500 acres in contour 3 and rest is outside the structure, the value would be:

$$500 * \frac{2{,}750{,}000}{5{,}000} - 275{,}000$$

However, the minimum tract value is $300/acre or $768,000 so the tract value is $768,000.

Senator **Bumpers**. That is a factor of price of the product, cost of drilling, all those things, is it not?

Mr. **Horn**. Yes.

Senator **Bumpers**. You should be fairly definitive in that and you can be, can you not?

Mr. **Horn**. Yes, we can.

Senator **Bumpers**. Now, if you know—well; let me ask this. What obligations are there on Standard Oil and ARCO to rehabilitate the Prudhoe Bay area when they leave?

Mr. **Horn**. That is one that I am not aware of, because they are all presently under State leases and I think the State panel that follows me would be the ones to ask on that.

Senator **Bumpers**. So far as you know, there are virtually none?

Mr. **Horn**. I am not aware. That is something that the State—the Federal Government is only involved there through things like 404 and endangered species. Well, there are not many there. Primarily 404 is most of our involvement.

Senator **Bumpers**. Does the Kaktovik Village Corp. own any of the mineral rights in this area?

Mr. **Horn**. No, it is the Arctic Slope Regional Corporation.

Senator **Bumpers**. How many acres do they own of the 1.5 million?

Mr. **Horn**. They do not own any of the 1.5 million. They own another 92,000 acres that is adjacent.

Senator **Bumpers**. In the Kaktovic area along the coast?

Mr. **Horn**. Yes. That 92,000 acres was not part of the 1.5 million acres.

Senator **Bumpers**. And that is where Standard drilled the exploratory oil well?

Mr. **Horn**. Yes, sir.

Senator **Bumpers**. And you still do not know whether they found anything or not?

Mr. **Horn**. That is correct.

Senator **Bumpers**. Finally, Mr. Chairman, let me just make this point. I remember when Scoop Jackson and I suggested that the Government get in the drilling business, back when I first came to the Congress. And there was a hue and cry against that and nobody wanted to do that.

Despite the fact that I am confessing to you that I am not as concerned about the environment of the 1002 area as I once was, as I say, I want you to know I am concerned about it.

The **Chairman**. Are you really concerned?

Senator **Murkowski**. He is just leaning, Mr. Chairman. We will take it.

Senator **Bumpers**. My question is this. Would it not be better and would it not take a lot of pressure off if the Government did in fact drill a few exploratory wells there? And you say the taxpayers would not put up with it. I am not at all sure that that is true.

And if we found very little oil, as opposed to a lot of oil, then Congress could make the decision on whether or not the environmental damage in building a pipeline from, say, Kaktovic over to Prudhoe Bay is environmentally acceptable based on the limited amount.

You find 300 million barrels of oil there, you have got a 20 day supply. I would not want to destroy the environment up there for that, would you?

Mr. **Horn**. That level of oil field by our predictions would not cross the economic threshold. You are talking about a 400 million barrel field minimum to make a go of it.

Senator **Bumpers**. Are you telling me that it would not be economically feasible to build a line from say Kaktovik to Dead Horse for 400 million, for any less than 400 million barrels?

Mr. **Horn**. That is our current predictions, unless the price of oil just absolutely skyrockets.

Senator **Bumpers**. Why would not the oil companies just love for us to do this?

Mr. **Horn**. Well, I think that part of the reason that we are opposed to an exploration only program is, one, the cost. I mean, you are talking $40, $50 million to drill a well.

It took us 10 wells to find Prudhoe Bay, and they thought they knew what they were looking for. In order to appropriately assess this area, you are talking a number of wells, and if you multiply each well times $40 million you are making the cash register really ring.

Secondly, as I said, the Government generally is not much in the high risk business, and we think there would be a lot of pressures to stop.

Third, we are foregoing revenue. If we lease it with the right to produce it if you find something, we think we can generate $2 to $4 billion of revenue for the treasury, with some split with the State.

If, however, we go out and expend $300, $400, $500 million drilling the wells and we come up basically empty, we are not going to collect any $2 to $4 billion. We will have foregone that money, coupled with spent another $400 to $500 million.

The exploration program will have cost the taxpayers in terms of out of pocket costs $3, $3.5 billion. I just do not think it is worth shifting that level of risk to the taxpayers when the private sector is willing to bear that risk and let us accrue a couple of billion dollars of revenue in the process.

Senator **Bumpers**. Thank you, Mr. Chairman.

The **Chairman**. Senator Fowler.

Senator **Fowler**. Mr. Secretary, is there anything—you are the Assistant Secretary of Fish and Wildlife and Parks. Is there anything unique about the coastal plain?

Mr. **Horn**. No. Every ecological area has got its own particular uniqueness.

Senator **Fowler**. Unique sort of usually means one of a kind.

Mr. **Horn**. The coastal plain of the North Slope really stretches all the way over to Point Hope——

Senator **Fowler**. Is there anything unique about 1002? Is there anything biologically unique about it?

Mr. **Horn**. No.

Senator **Fowler**. Is there anything botanically unique about it?

Mr. **Horn**. There is one threatened or endangered plant that we have there, that is found elsewhere on the North Slope, so it is not unique in that narrow sense.

Senator FOWLER. Is there any other ecosystem like it in the United States?

Mr. HORN. Yes. As I said, we have got the entire North Slope of the Brooks Range is essentially like that. There is one factor that makes it geographically different. It is the one place on the coast where the mountains get that close to the sea, and so you have a geographical uniqueness.

Senator FOWLER. Those botanists and those biologists who say this is a unique ecosystem—those separate disciplines do not know what they are talking about?

You have already told me that energy was not in your realm, and yet we have had an hour of your energy policy. And you have told Senator Bradley that you are going to drill in the winter time when, as you said—and we quote around here now—"the animals are long gone."

So you obviously do not know about the polar bears, and you do not know that there are fish and wildlife in the sea where they are drilling.

So those botanists and biologists, all those people who are saying that this is a unique area, you would strongly disagree with? Am I correct? Just answer my question.

Mr. HORN. We have musk oxen populations elsewhere in Alaska. We have polar bear populations along the entire Arctic coast, the Soviet Union, Canada, America. We have caribou calving throughout Alaska and North America. The largest caribou herd—

Senator FOWLER. I understand. I just assume that you speak for—your primary responsibility is fish and wildlife and parks.

Mr. HORN. That is correct.

Senator FOWLER. You are the highest ranking official on fish and wildlife and parks?

Mr. HORN. Yes, sir.

Senator FOWLER. And yet, all of your testimony is about the enormous potential for oil and gas, and also a long statement about how much money we are going to save and we would be deprived of significant revenues if we followed the course that Mr. Bumpers suggests.

I just wondered, who do we talk to to find out whether or not, if you disagree, whether there is anything unique that we ought to be looking at when we are writing this legislation?

Mr. HORN. Mr. Chairman——

Senator FOWLER. You say there is nothing there.

Mr. HORN. I am responding to the committee's request to focus on the legislation, on 1217. In my prior appearances before this committee, we have gone at length through the issues of musk ox distribution, snow geese nesting, peregrine falcons.

Senator FOWLER. All I want, since we are writing legislation and you are the highest ranking, you are saying what you are saying to me, even though you will not say it, is there is nothing unique about the wildlife or the fish or the park aspects of it, and therefore you are strongly pushing for its development.

That is a fair statement of what you just told me and the committee, is it not?

Mr. HORN. That is correct. It is a very important area. It has got important wildlife resources. But it is not unique. I can take you to places in Alaska——

Senator FOWLER. And if you were back as the Secretary when Mr. Seward was the Secretary in our country and the Russians said: We are not going to give you all of Alaska, we are just going to sell you the coastal plain because we think it is a unique Arctic ecosystem with unique potential for scientific research for the benefit of a new and struggling nation, you would say no deal, we are not going to waste our money, it is not unique, and therefore let us talk about another sale?

Mr. HORN. If it was the only piece we could have gotten, I would have taken it.

Senator FOWLER. In the interest of time, that is all my questions.

The CHAIRMAN. Thank you very much, Secretary Horn. You have been very helpful to the committee. And we do have the outstanding request for the legal opinion and for a time line chart for the issues and for——

Mr. HORN. The revenue projections.

[The information follows:

Several alternative scenarios that have been developed in response to other questions are attached.

ANWR: BONUS, RENT AND ROYALTY

Based on the general guidance and assumptions provided, the following estimates have been made on the bonus, rent and royalty revenues from competitive oil and gas leasing within ANWR in 1994. In 1987 dollars the revenues would be: bonuses $1.38 billion in 1994, rents $3.2 million from 1994 through 2001 and royalties $13.4 billion from 2002 through 2036. The actual dollars (i.e. nominal amount) taken in those years would be larger due to inflation, for example the bonus amount in 1994 dollars would be $1.8 billion. Fifty percent of these revenues are shared with the State of Alaska. The following assumptions were used per your instructions:

> Limit leasing to blocks A, B, and C (see figure III-1, page 55, Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, U.S. Department of the Interior),
>
> Fixed royalty rate of 16 2/3%,
>
> Leasing in 6 years (1994),
>
> Production in 14 years (2002),
>
> State revenue share of 50%,
>
> Rental rate of $2/acre until discovery and $3/acre after discovery, assuming no rental payment after the commencement of royalty payment.

Additional key assumptions used in the analysis are:

> A discovery in 1996 equal to the conditional mean recoverable oil and and gas estimate for prospect 19,
>
> Bonus based on current estimates of risk and oil probability distributions,
>
> Real after tax rate of return of 10.0%,
>
> Inflation rate of 4.0%,
>
> The 1987 price of North Slope oil in the lower 48 States is $18.00/bbl,
>
> Alaska income tax rate of 9.4% and currently applicable severance, conservation and property taxes,

Federal income tax rate of 34%,

Pipeline costs are based on concurrent development on the non-Federal portions of prospect area 19.

Bonus, rent and royalty revenues are limited to tracts leased in the assumed 1994 lease sale, i.e one sale only - additional revenue would come from additional sales but that amount is highly dependent on the discovery of oil, and the location and size of that discovery,

From these leased Federal tracts production occurs only on block C prospect area 19 and royalty revenues are limited to this production, as above, additional royalty revenues would be realized if areas other than block C were found to be productive,

Analysis of Federal revenues from sand and gravel production was not undertaken due to uncertainties of its use being authorized and the relatively small revenues expected from these sources.

ANWR REVENUE ESTIMATES

This scenario assumes that an ANWR leasing bill passes in FY 1988 and that a lease sale occurs within 2 years, i.e. FY 1990. Exploration will commence in FY 1991 and continue through FY 1994. Assuming commercial quantities are found, development will start in FY 1995. Production will start in FY 1999.

This estimate only is concerned with revenues through FY 1993, thus royalties are not included since they would not begin until production starts up in 1999. There are many alternatives that can be hypothesized, but we will limit this analysis to three sub-scenarios.

The estimated revenues in nominal dollars (assuming 4 percent inflation) ranges from $1.6 billion to $6.8 billion in bonuses and from $2.1 million to $3.0 million in rents. In $1987 these ranges would be $1.4 billion to $5.5 billion in bonuses and $1.7 million to $2.5 million in rents. These are totals, of which the State of Alaska would receive 50 to 90 percent, depending on the enabling legislation.

Scenario 1: There is a sale in FY 1990 but no other sales until after FY 1993. Only 200,000 acres are leased, but these include many of the best areas as well as many tracts off known structures.

Scenario 1

Year	Bonus	Rent
1990	$1.6 billion	$600000
1991		600000
1992		600000
1993		600000

Scenario 2: There is the sale from scenario 1 in FY 1990 and a follow up sale in FY 1992 before exploration results add significant new information. Another 200,000 acres are leased including many of the lesser valued structures.

Scenario 2

Year	Bonus	Rent
1990	$1.6 billion	$600000
1991		600000
1992	$1.3 billion	1200000
1993		1200000

Scenario 3: There is the sale from scenario 1 in FY 1990. Significant discoveries are made such that expected values are four times our current expectations. A follow up sale occurs in FY 1993 in which 200,000 acres are leased.

Scenario 3

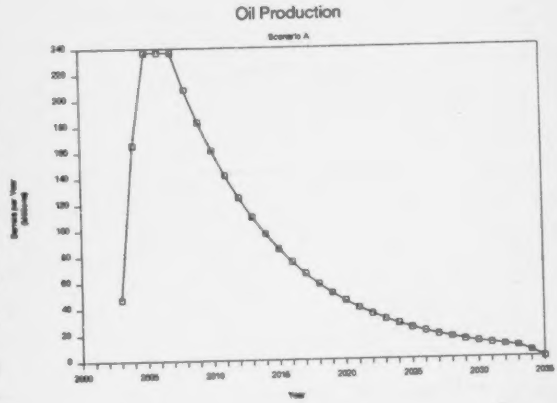
Year	Bonus	Rent
1990	$1.6 billion	$600000
1991		600000
1992		600000
1993	$5.2 billion	1200000

The following assumptions were used in this analysis.

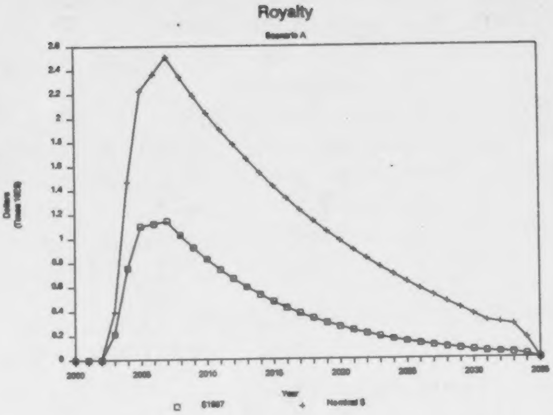
- The sale in FY 1990 is limited to blocks A, B, and C (see figure III-1, page 55, Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, U.S. Department of the Interior),
- The follow-up sales can occur in all blocks.
- Fixed royalty rate of 16 2/3 percent,
- Rental rate of $3 per acre,
- Bonus based on current estimates of risk and oil probability distributions (except as noted in Scenario 3),
- Real after tax rate of return of 10 percent,
- Inflation rate of 4 percent,
- The 1987 price of North Slope oil in the lower 48 states is $18.00 per barrel, the expected price in 2000 is in the range of $20 to $40, and the real expected increase after 2000 is an average 2 percent per year,
- The current Federal and State tax laws will apply.

In response to a previous request, we indicated that we expected $1.38 billion ($1987) from a lease sale in 1994. This assumed leasing 200,000 acres, including much of the best acreage available. The range of tract values is from $300 to $37,000 per acre ($1987), with an average of $6,900 per acre.

Production is assumed from the 50,000 best acres and occurs as shown in the graph on the right.



The peak royalty occurs in the year 2007 and is $2.5 billion (nominal) or $1.2 billion ($1987). The distribution over time is shown in the graph to the right, both in nominal and $1987.



The **Chairman**. The revenue projections, and for a statement on an alternative to the 10 year leasing.

Thank you very much, Secretary Horn.

Senator **Murkowski**. The record for questions will be open for how long, Mr. Chairman?

The **Chairman**. Two weeks.

I really must apologize to our next four witnesses: Richard Sanderson, Director of the Office of Federal Activities at EPA, together with our Alaskan panel. I am sorry I have to cut you so short.

But Mr. Sanderson, if you would begin. If you would try to sum up within 10 minutes, we would appreciate it.

STATEMENT OF RICHARD E. SANDERSON, DIRECTOR, OFFICE OF FEDERAL ACTIVITIES, ENVIRONMENTAL PROTECTION AGENCY

Mr. **Sanderson**. Thank you, Senator. My statement initially said "good morning." I think I will change it to good afternoon.

And I think I will summarize it with about 3 or 4 minutes and then try to answer your questions.

As I said, I am Richard Sanderson, Director of the Office of Federal Activities of the U.S. Environmental Protection Agency. I am here at your request to discuss EPA's position on S. 1217, a bill to amend the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease in an expeditious and environmentally sound manner the public lands within the coastal plain of the Arctic National Wildlife Refuge for oil and gas exploration, development, and production.

EPA's primary involvement with the issues relating to the decisionmaking process on opening the ANWR to oil and gas activities derives from our environmental review responsibilities under section 309 of the Clean Air Act and the National Environmental Policy Act.

Pursuant to these responsibilities, the agency reviews over 250 environmental impact statements annually. Moreover, since 1975 EPA has reviewed and commented on 51 documents from the environmental impact statements associated with oil and gas exploration, leasing, development, and production activities in the State of Alaska.

Quickly summarizing, EPA and the Department of Interior agree that, if it is the decision of Congress to open the National Wildlife Refuge, NEPA compliance will be achieved at each stage of leasing and development to assist in the environmental decisionmaking process.

EPA understands that the Department of the Interior proposes to use such a tiered EIS process for any oil and gas leasing development in ANWR.

Second, EPA now understands that it was and is the Department of Interior's intention that the present responsibility for implementing all existing environmental laws will apply to activities in ANWR.

With respect to the bill before us today, S. 1217, EPA has three general concerns. First, it is not clear in the bill whether all present Federal agency responsibilities for the permitting, monitoring, and enforcement of environmental regulations would be applicable to the oil and gas activities in ANWR.

A functioning regulatory structure is now in place for North Slope activities. This should be retained to provide efficient and effective environmental protection.

Secondly, EPA is concerned that the 1-year time frame for completion of the initial lease sale will prevent the development of adequate environmental protection measures to effectively deal with problems likely to arise in implementing an oil and gas leasing program in ANWR. There is a consensus that unique environmental impact mitigation technologies will be necessary if ANWR is to be opened to oil and gas exploration and development.

A lack of appropriate lead time to design and implement effective environmental safeguards and mitigation measures would worsen potential environmental impacts resulting from these activities.

Lastly, EPA is concerned that the bill would preclude further environmental analysis at the lease sale stage. Based upon our discussions with the Department of Interior and recognizing their experience with other lease sale proposals such as those taking place for lands on the outer continental shelf, it is EPA's position that to fully comply with the applicable environmental protection statutes and to provide for the most balanced lease sale decision, lease sale environmental impact statements should precede leasing activities.

In the past, these documents have provided the necessary foundation, allowing the lease sale decisionmaking process to proceed in an orderly and environmentally sound manner. We agree with Assistant Secretary Horn that the bill should be amended to reflect these concerns.

With that, I conclude my formal remarks and make myself available to any questions you may have.

[The prepared statement of Mr. Sanderson follows:]

RICHARD E. SANDERSON
DIRECTOR
OFFICE OF FEDERAL ACTIVITIES
BEFORE THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
U.S. SENATE

OCTOBER 13, 1987

Good morning Mr. Chairman and members of the Subcommittee, I am Richard E. Sanderson, Director of the Office of Federal Activities, U.S. Environmental Protection Agency. I am here at your request to discuss EPA's position on S. 1217, a bill to amend the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the public lands within the Coastal Plain of the Arctic National Wildlife Refuge for oil and gas exploration, development and production.

EPA's primary involvement with issues relative to the decision-making process on opening the Arctic National-Wildlife Refuge to oil and gas activities derives from our environmental review responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act. Pursuant to those responsibilities, the Agency reviews over 250 environmental impact statements annually. Moreover, since 1975, EPA has reviewed and commented on fifty-one EIS documents associated with oil and gas exploration, leasing, development and production activities in the State of Alaska. Under those same responsibilities, EPA formally commented on the draft and final Legislative Environmental Impact Statements prepared by the U.S. Fish and Wildlife Service.

In EPA's comments to Assistant Secretary of the Interior, William Horn, on the draft Legislative Environmental Impact Statement, we raised a number of concerns regarding the potential environmental impacts identified in the report and concluded that, based on our experience, more information and discussion of the environmental implications of oil and gas activities in the Refuge was necessary and should be provided in the final Legislative Environmental Impact Statement. On June 1, 1987, EPA transmitted formal comments to the Assistant Secretary on the final Legislative Environmental Impact Statement.

EPA's position on procedural as well as substantive issues associated with the ANWR review are documented in our letter of June 1, and in the testimony provided before other Congressional committees. I believe these documents are in the possession of the Committee, but I will be glad to provide copies for the record.

Since our comment letter on the final LEIS, we have met with the Department of Interior several times to discuss the concerns we raised with the final LEIS. Although there remain a number of unresolved issues, two of the major issues have been resolved to the mutual satisfaction of both agencies.

First, EPA and the Department of Interior agree that if the decision of Congress is to open ANWR, NEPA compliance will be acheived at each stage of leasing and development to assist in the environmental decision-making process. EPA understands that the Department of Interior proposes to use such a tiered EIS process for any oil leasing and development in ANWR. Second, EPA now understands that it was and is the Department of the Interior's intention that present responsibilities for implementing all existing environmental laws will apply to activities in ANWR.

With respect to the bill before us today, S. 1217, EPA has three general concerns. First, it is not clear in the bill whether all present Federal agency responsibilities for the permitting, monitoring and enforcement of environmental regulations would be applicable to oil and gas activities in ANWR. A functioning regulatory structure is now in place for North Slope activities and should be retained to provide efficient and effective environmental protection. Second, EPA is concerned that the one year time frame for completion of the initial lease sale would prevent the development of adequate environmental protection measures to effectively deal with problems likely to arise in implementing an oil and gas leasing program in ANWR. There is a consensus that unique environmental impact mitigation technologies will be necessary if ANWR is to be opened to oil and gas exploration and development. A lack of appropriate lead time to design and implement effective environmental safeguards and mitigation measures could aggravate adverse environmental impacts resulting from proposed activities.

Lastly, EPA is concerned that the bill would preclude further environmental analysis at the lease sale stage. Based upon our discussions with the Department of Interior and recognizing their experience with other lease sale proposals, such as those taking place for lands on the Outer Continental Shelf, it is EPA's position that to fully comply with applicable environmental protection statutes and to provide for the most balanced lease sale decision, lease sale environmental impact statements should precede leasing activities. In the past, these documents have provided the necessary foundation, allowing the lease sale decision-making process to proceed in an orderly and environmentally sound manner.

We agree with Assistant Secretary Horn that the bill should be amended to reflect our mutual concerns. With that, I conclude my formal remarks. I will be pleased to answer any questions members of the committee may have.

The CHAIRMAN. Thank you very much.

Rather than go to questions at this time, I think it is probably the best idea to go to our next panel and then have questions on all four of you at the same time. So if you will just stay where you are and let me call for the next panel.

The next panel is from the State of Alaska: Alvin Ott, Director of Habitat Division for the Alaska Department of Fish and Game; Larry Dietrick, Director of Environmental Quality from the Alaska Department of Environmental Conservation; and Bill Van Dyke, Petroleum Manager for the Division of Oil and Gas, Alaska Department of Natural Resources.

Gentlemen, your statements are excellent. They give us a lot of detail. There is not time to read the statements, and what I would prefer and ask that you do is to, in lieu of reading your statements, is to advise the committee the two or three things that you think are most important, that you would urge us to put in this legislation, if you would be prepared to do that.

So let us lead off with Mr. Ott.

STATEMENT OF DR. ALVIN G. OTT, REGIONAL SUPERVISOR, HABITAT DIVISION, ALASKA DEPARTMENT OF FISH AND GAME

Dr. OTT. My name is Al Ott. I am the Regional Supervisor with the Habitat Division, Department of Fish and Game in Fairbanks, Alaska.

If I had to summarize two or three points from various testimonies and from the various materials that we have submitted, it would probably involve the following two or three items.

Number one, we believe there is a significant difference between exploratory activities and development activities, and that separate terms and conditions should be developed for those two different aspects of oil and gas development. To a large extent, exploratory activities can occur during the winter season and many of the impacts can be mitigated.

On the other hand, development activities require a significant number of additional steps in order to ensure the mitigation of adverse effects to fish and wildlife.

Number two, we believe that it is necessary to have a joint State-Federal cooperative approach, both in terms of permitting, design review, field compliance, and enforcement, and that such a program or team be project-oriented, have adequate funding, and adequate technical expertise to deal with oil and gas development.

That concludes my two major points.

[The prepared statements of Dr. Ott follow:]

TESTIMONY OF DR. ALVIN G. OTT
BEFORE THE SENATE COMMITTEE
ON ENERGY AND NATURAL RESOURCES
October 13, 1987

Mr. Chairman and members of the Committee:

My name is Dr. Alvin G. Ott. I am the Regional Supervisor of the Habitat Division with the Alaska Department of Fish and Game in Fairbanks, Alaska.

INTRODUCTION

The Porcupine Caribou Herd (PCH) is a significant international resource. Its lengthy migrations are an impressive ecological event and an important link in the northern Alaska and Yukon wildlife and human ecosystem. Several Indian and Eskimo communities on both sides of the border rely heavily on the PCH for subsistence.

During their annual cycle, pregnant cows of the PCH migrate to the coastal plain in Alaska and northwestern Canada to calve. Although some calving likely occurs over most of the coastal plain, calving concentrations are readily apparent in some areas. The concentration area which has been most frequently and heavily used has been called the "core" calving area.

The PCH also forms huge post-calving aggregations. These huge aggregations move extensively within the coastal plain and foothills to gain relief from mosquitoes and other insect pests. Biologists believe that unrestricted access to these relief areas is important to the herd's well-being.

The State of Alaska is concerned that oil and gas development in the 1002 area of the Arctic National Wildlife Refuge (ANWR) could adversely affect use of calving areas. We have recommended that approximately 15% of the 1002 area, that portion delineated in the draft 1002 report as the "core" calving area, be deferred from leasing for ten years. During this moratorium, a seven-year research program would be undertaken to improve our understanding of the importance of this core calving area, to assess the effects that oil development may have on use of the area, and to develop appropriate mitigative measures.

The objective of the approach described here is to ensure the viability of the Porcupine Caribou herd. I want to emphasize, however, that there may be other ways to achieve this objective. We remain open to hearing other ideas which may accomplish this end. The State would like to work with the Energy Committee to develop an approach which will foster exploration and development of the oil and gas potential of the Coastal Plain while protecting the Porcupine Caribou herd.

In addition, in order to mitigate the effect of development on the use of early summer habitat we have recommended that, within three miles of the coast, only those facilities that cannot be sited elsewhere be allowed. We have also recommended that a study be undertaken to evaluate the responses of large aggregations to a road/pipeline simulation and to develop measures that would assure free passage of these aggregations.

THE CENTRAL ARCTIC HERD EXPERIENCE

Before considering the distribution of the PCH within the ANWR coastal plain, we will review the status of knowledge on the responses of the Central Arctic Herd (CAH) to petroleum development in the Prudhoe Bay area and comment on the relevance of those observations to the ANWR issue. We will discuss the effect of development on habitat use and population size sequentially. As the principal concerns for both herds currently apply only to calving and midsummer, the discussion will be restricted to those two periods.

Habitat Use

Results of aerial surveys over the past ten years indicate that the majority of the CAH, like other arctic herds in North America, calves predictably in certain specific areas--primarily near Milne Point and the Canning Delta (Fig. 1), but also in the adjacent uplands to the south. When spring snowmelt is late, relatively more calving occurs in inland areas than in coastal regions. In the "average" year, however, most parturient cows are found in coastal concentrations.

Estimates of caribou density have also been made during the calving period for various regions between the Colville and Canning Rivers. The results show that densities within the area encompassing the Prudhoe Bay oilfield complex are less than one-half of the next lowest density area and less than one-tenth of the highest density area. While there is little reason to believe that the immediate Prudhoe Bay area previously supported particularly high densities of calving caribou (i.e., on the order of those near Milne Point or the Canning Delta), we believe that reduced calving in that area is due to the presence of a major oilfield complex.

Additional abnormalities in calving distribution have been observed in the vicinity of the Milne Point oilfield complex, west of Prudhoe Bay. A comparison of caribou distribution during the four years prior to construction with that during the four years after road placement indicates that only half as many cows and calves used the area within two miles of the road right-of-way after the road was build. The logical implication of these results is that an extensive, dense network of transportation corridors may well result in widespread loss of calving habitat. In hindsight, we believe that this occurred in the Prudhoe Bay complex as it grew from a minor oilfield with minimal support facilities in the early 1970's, to a large development center. Additional losses of calving habitat within the traditional concentration area west of Prudhoe Bay may be forthcoming as the Kuparuk and Milne Point oilfields continue to expand to their full recovery potential. Figure 2 depicts the regional growth of oil-related development that has occurred in only 12 years.

The second of our major concerns involves a decline in the use of developed areas during midsummer. During this period, caribou must maximize nutrient intake to promote growth and fattening, and, in the case of maternal females, to meet the metabolic demands of lactation. It is generally believed that failure to attain a minimum standard of body condition by autumn may result in reduced reproductive performance of females and predispose calves to higher rates of mortality.

The summer grazing process is complicated considerably by the frequent appearance of insect pests, which become active during warm, calm periods. Caribou of the CAH respond to insect attack by aggregating and moving rapidly to coastal areas where lower temperatures and higher winds discourage insect activity. With an abatement of insect attack, caribou disperse and drift inland to preferred feeding areas. Thus, numerous movements may occur between coastal insect relief habitat, where energy expenditure can be minimized, and inland foraging areas, where energy intake can be maximized. The result, in theory, is a net increase in energy retention. We therefore believe that unrestricted summer movements are of considerable importance.

Unfortunately, our experience in the Prudhoe Bay area over the past decade suggests that maintaining the functional integrity of caribou summer range might not be possible, given the widespread surface use requirements for oil and gas development. Overall caribou density within the oilfield complex is considerably lower than in adjacent areas, and cows and calves are not present in normal numbers. Apparently, industrial growth of the area has also greatly restricted the east-west summer movements of caribou. In the late 1960's and early 1970's, several authors reported the passage of large groups (i.e., in the thousands) through what is now the main oilfield complex. Since the late 1970's, however, there has been little movement of caribou through this complex. The known movements of numerous radio-collared caribou confirm this observation.

Recent observations suggest that CAH caribou are experiencing difficulty gaining access to various components of summer range within the Kuparuk and Milne Point oilfields. As oil development in the region continues to expand and intensify, large portions of habitat may become inaccessible. Thus far, however, caribou have continued to occupy the general region in moderate numbers, despite localized abnormalities in distribution and the impediments to movement posed by an increasingly complex system of roads and pipelines. But the future is uncertain with respect to continual use of this portion of CAH summer range.

Population size

The CAH has undergone rapid growth during the period of oil development in the Prudhoe Bay area--from 6,000 in 1978 to an estimated 16,000 at present, in spite of the affects on habitat use discussed above. The following factors may account for the increase in herd size:

1. Only a small percentage of the total calving and summer range has been affected to date, and it appears that suitable alternative areas remain available.
2. Wolves, a major predator of caribou, were sharply reduced in the region in the late 1970's.
3. Hunter harvest has been generally low.
4. Winter weather has been generally favorable.
5. Summer insect activity has been low-to-moderate--at least in recent years.
6. Mitigative measures have been incorporated into the Kuparuk and Milne Point oilfields in the form of modified pipeline configurations, special crossing structures, and some restrictions on traffic.

Favorable environmental factors, some of which are short-term, make it impossible to determine what affect development has had on the long-term health of the Central Arctic Herd.

Experiences with the CAH provide the primary basis for predicting the responses of PCH caribou to oil development. However, we believe that the two herds are not entirely comparable in terms of susceptibility to disturbance, owing to differences in herd size and the distribution of seasonal habitats. In contrast to the apparently numerous habitat options available to the CAH, the PCH has relatively few. Quite simply, with a narrower coastal plain within ANWR, less calving habitat is available to the PCH--an effect that is compounded further by its greater size. The net result is less flexibility in the use of calving areas. Also, the PCH typically forms huge aggregations in midsummer. These are frequently on the order of 50,000-80,000 animals, far larger than those of the CAH, which tend to number only 3,000-4,000 at maximum. Recent work on the CAH indicates that large groups have considerably more difficulty negotiating roads and pipelines than small groups, but it is impossible to predict at this time how large aggregations of the PCH would react to production facilities, roads and pipelines, and human activity characteristic of oilfields, much less the long-term consequences to the population of serious perturbations in distribution and movements that might occur as a result. Also, the PCH would contact industrial development on the coastal plain for only a brief period each year (i.e., less than 2 months), and might therefore react more strongly to disturbance stimuli than CAH caribou. That is, the PCH may be relatively "naive," and predictions based on CAH responses may underestimate the impacts on caribou within ANWR.

On the other hand, much of the knowledge gained on the CAH over the past ten years should apply rather well to the PCH. For example, there is little reason to expect that the qualitative responses of PCH females during calving will be markedly different from those documented for CAH females; we can anticipate similar avoidance responses to linear structures placed within calving areas. And we now know from work on the CAH that heavy traffic on roads, in close proximity to elevated pipelines, reduces caribou crossing success. Mitigation strategies, such as buried pipelines, road/pipeline separations, and strict traffic restrictions could be effective on both herds.

THE PORCUPINE CARIBOU HERD

The PCH occupies three fairly distinct wintering areas in Alaska and western Canada: The vicinity of Arctic Village and Venetie, the Richardson Mountains, and the Ogilvie Mountains/upper Peel River. In spring, pregnant females move northward along three principal routes, known as the Old Crow, Richardson, and Chandalar routes. The onset of spring migration, the particular route selected, and rate of travel are highly dependent on regional snow conditions and the wintering area occupied. Movements appear to be highly "purposeful," in that cows delayed by adverse snow conditions compensate by subsequently traveling faster (often 20-30 km/day) when conditions improve. The initial destination appears to be a "staging area" along the lower Firth River in Canada, which is often snow-free earlier than other areas to the west. If snow conditions are generally favorable on the coastal plain, cows will continue westward to the main calving area south of Barter Island. Some calving occurs elsewhere on the coastal plain, creating the false impression of a broad continuum of calving activity; but in the overwhelming majority of years for which adequate records are available, a large calving concentration was clearly apparent between the Hulahula and Aichilik Rivers.

After calving, the bulls and yearlings, which had slowly followed the northward progression of snow-melt and "green-up," join the cows and newborn calves. Large mixed aggregations (in the tens of thousands) form on or near the main calving area and move extensively within the coastal plain, frequently under the influence of insect harassment. By mid-July most of these aggregations have moved eastward along the coast into Canada, although variable numbers of caribou move directly through the mountains, thence to midsummer ranges in Canada or on the south slopes of the eastern Brooks Range. In late summer, caribou begin a drift toward wintering areas, completing the annual cycle of movement.

The central issue here is the location and use of a discrete calving area by the PCH. It should be emphasized that the concept of traditional calving areas is not new. Since the 1960's, caribou herds have been identified on the basis of their use of a common calving ground. Such areas have been described for most Alaskan and Canadian herds, and several herds in the Soviet Union as well. The available data on many herds indicate that there are areas of concentrated calving within traditional calving grounds. Those concentration areas occupied most frequently in high density are known as "core" calving areas.

The survey methodologies employed over the years have been extremely variable in terms of timing, overall effort, type and number of aircraft used, and the availability of radio-collared caribou. Also, many early surveys yielded data that are of marginal usefulness in addressing the present issue. Surveys since 1982 were designed for the express purpose of closely monitoring movements, determining actual calving sites, and delineating calving concentrations. We now routinely employ satellite-tracking technology and conventional radio-telemetry techniques as integral components of our field program.

In spite of recent improvements in our surveillance capabilities, virtually all data on PCH calving distribution are principally qualitative and descriptive. Some progress has been made in quantifying the occurrence of caribou in various areas, but precise density figures are still lacking, and boundaries are based largely on subjective judgment.

A second problem lies in the dynamics of the calving process itself, in that a changing situation is extremely difficult to describe using point-in-time measurements. Calving occurs continuously over roughly a two-week period, during which an individual female caribou may be both highly mobile and nearly sedentary. Thus, at any given time during the calving period, some pregnant females are enroute to actual calving sites, others with new calves are relatively stationary, and still others with older calves may be undergoing moderate movements characteristic of the post-calving phase. For this reason, survey results obtained early in the calving period may be more a reflection of movements into calving areas than the distribution of caribou during calving per se; similar errors are likely if surveys are conducted too late in the calving period.

Such problems in the design and timing of surveys, together with other unknowns regarding the completeness and quality of coverage, place severe limitations on reinterpreting much of the early information on calving distribution of the PCH. In fact, considerable care must be taken to avoid refining the analyses beyond the inherent precision of the original data. These and other restrictions preclude a totally precise delineation of calving concentrations for any given year.

Nevertheless, consistencies in calving distribution do emerge when 16 years' data are superimposed graphically. Even the most cursory examination reveals a clear pattern of recurrent--albeit not exclusive--use of the Jago Uplands, between the Hulahula and Aichilik Rivers (Fig. 3). In more than 90% of the annual observations, this area included a calving concentration. Furthermore, in more than 60% of the years for which estimates of relative caribou abundance were reported, the Jago Uplands supported more calving caribou than any other area within the PCH range (Table 1).

The "core" calving area, as defined in the draft 1002 report, lies within the Jago Uplands. The core area describes the zone of heaviest use for calving, based on a thorough examination of all available data. In addition, participants at a 1985 caribou workshop sponsored by USFWS agreed that this core area best describes a common zone of concentrated calving activity, and that it is of sufficient size to accommodate the majority of calving caribou in the herd.

Recurrent, heavy use of certain calving areas implies a strong preference, and the persistence of such a tradition implies a net benefit to the herd in terms of calf production and survival. Among the possible attributes of calving concentration areas are:

1. A relative scarcity of predators.
2. Early snow ablation with locally advanced forage availability.
3. Proximity to insect relief habitat.

Most likely, several factors are instrumental in sustaining an affinity for certain specific calving areas, and all may not be important in a given year. It is conceivable that, from an evolutionary point of view, the tradition is retained primarily to offset the effects of exceptionally adverse conditions, perhaps in the form of heavy predation or deep snow during the previous winter; the periodic advantages derived from certain habitats would therefore tend to buffer fluctuations in the herd. The overall benefits to the PCH may be extremely subtle, but nonetheless important to the long-term well-being of the population.

INFORMATION NEEDS

The State has recommended that leasing in the core calving area be deferred for a ten-year period. During this moratorium, a research program would be undertaken that consists of four main components:

1. To evaluate the physical and biological characteristics of core and peripheral calving areas; features such as the vegetation, topography, meteorology, predator abundance, predation rates, and caribou use would be compared between core and peripheral areas.
2. To evaluate the effects of oil development on caribou calving distribution; because oil development would not occur within the core calving area of the PCH, this evaluation would rely on the continuation of the long-term study of the CAH, and especially the responses of calving caribou to continued development in the Kuparuk oilfield.
3. To evaluate the effects of oil development on insect-induced movements, particularly movements of the extremely large groups that commonly occur in the PCH; this component would focus on the responses of such large groups to a simulated transportation system, as well as analyzing the bioenergetics of such movements.
4. To characterize the caribou harvest in villages within the range of the PCH, principally Kaktovik and Arctic Village; this baseline information would be used in evaluating the effects of oil development on subsistence use of caribou.

We believe that the results of this research program would improve our understanding of the importance of the core calving area to the PCH, and would improve our ability to predict the potential effects of oil development on the herd, thereby providing a more informed basis for recommending mitigative measures.

TESTIMONY OF DR. ALVIN G. OTT
BEFORE THE SENATE COMMITTEE
ON ENERGY AND NATURAL RESOURCES
October 13, 1987

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

MY NAME IS DR. ALVIN G. OTT. I AM THE REGIONAL SUPERVISOR OF THE HABITAT DIVISION WITH THE ALASKA DEPARTMENT OF FISH AND GAME IN FAIRBANKS, ALASKA.

THE TESTIMONY PRESENTED TODAY FOCUSES ON OIL AND GAS EXPLORATION AND PRODUCTION IN THE 1002 AREA OF THE ARCTIC NATIONAL WILDLIFE REFUGE (ANWR), AND SPECIFICALLY HOW ENVIRONMENTAL IMPACTS FROM LARGE SCALE DEVELOPMENT PROJECTS CAN BE MITIGATED BASED ON EXPERIENCES WITH OIL AND GAS PRODUCTION ON THE NORTH SLOPE OF ALASKA. THE STATE OF ALASKA HAS CONSIDERABLE EXPERTISE, PARTICULARLY THE ALASKA DEPARTMENT OF FISH AND GAME (ADF&G), IN TERMS OF POTENTIAL IMPACTS TO FISH AND WILDLIFE RESOURCES AND ACCEPTABLE MITIGATION WITH RESPECT TO OIL AND GAS EXPLORATION AND PRODUCTION.

IT IS IMPORTANT TO RECOGNIZE THE SCOPE AND MAGNITUDE OF OIL PRODUCTION, AS CONTRASTED WITH EXPLORATION. THE STATE OF ALASKA'S COMMENTS ARE BASED ON THE ASSUMPTION THAT IF AN AREA IS LEASED, PRODUCTION OF OIL AND GAS MAY OCCUR. ENCLOSURE #1 OF THIS TESTIMONY DEPICTS OIL PRODUCING FACILITIES IN PLACE IN 1973 AND 1985 IN THE PRUDHOE BAY AND ADJACENT AREAS. AS CAN BE CLEARLY SEEN BY THE SIGNIFICANT INCREASE IN NUMBER OF FACILITIES BETWEEN 1973 AND 1985, OIL

PRODUCTION IS AN ONGOING ACTIVITY WITH FACILITIES BEING ADDED CONTINUALLY. FOR EXAMPLE, ARCO ALASKA, INC. RECENTLY SUBMITTED PRELIMINARY APPLICATIONS FOR ANOTHER SEVENTEEN DRILL PADS IN THE KUPARUK DEVELOPMENT AREA.

IN ORDER TO EFFECTIVELY MITIGATE POTENTIAL ADVERSE ENVIRONMENTAL EFFECTS OF OIL AND GAS ACTIVITIES, WE HAVE TAKEN THE FOLLOWING STEPS:

(1) A SIGNIFICANT AMOUNT OF INFORMATION HAS BEEN GATHERED BY THE U.S. FISH AND WILDLIFE SERVICE (USFWS) AND THE ADF&G OVER THE PAST FIVE YEARS ON THE DISTRIBUTION AND ABUNDANCE OF FISH AND WILDLIFE RESOURCES IN THE ANWR. THESE DATA HAVE BEEN REVIEWED AND ANALYZED IN ORDER TO IDENTIFY HABITATS OF SPECIAL CONCERN TO SELECTED SPECIES OF FISH AND WILDLIFE;

(2) DATA GAPS HAVE BEEN IDENTIFIED AND STUDIES RECOMMENDED TO FILL THESE DATA GAPS;

(3) EXISTING OIL AND GAS ACTIVITIES ON THE NORTH SLOPE HAVE BEEN EXAMINED TO DETERMINE THE TYPE AND NUMBER OF FACILITIES REQUIRED FOR THE PRODUCTION OF OIL AND GAS IN COMMERCIAL QUANTITIES AND THE IMPACTS OF THESE FACILITIES ON FISH AND WILDLIFE HABITATS;

(4) GENERAL MITIGATIVE MEASURES (FOR EXAMPLE, ENVIRONMENTALLY SOUND STANDARDS FOR FACILITY SITING) THAT WE HAVE FOUND NECESSARY TO ENSURE ADEQUATE PROTECTION OF KEY FISH AND WILDLIFE HABITATS HAVE BEEN RECOMMENDED TO THE DEPARTMENT OF THE INTERIOR (DOI); AND

(5) RECOMMENDATIONS HAVE BEEN MADE TO THE DOI TO ENSURE THAT A PROPER LEGAL FRAMEWORK IS IN PLACE FOR A SOUND REGULATORY BASIS FOR THE IMPLEMENTION AND ENFORCEMENT OF REQUIRED MITIGATION.

IT ALSO WILL BE NECESSARY TO REFINE AND MODIFY MITIGATIVE MEASURES BASED ON FUTURE RESEARCH AND NEW INFORMATION.

FURTHERMORE, IF AREAS WITHIN ANWR ARE LEASED, SITE SPECIFIC MITIGATION WILL BE NEEDED FOR EACH EXPLORATION AND PRODUCTION PLAN. FIELD MONITORING AND COMPLIANCE ALSO WILL BE REQUIRED TO ENSURE, TO THE EXTENT PRACTICABLE, THAT MITIGATIVE MEASURES ARE WORKABLE AND THAT COMPLIANCE IS ACHIEVED DURING FIELD ACTIVITIES.

THE STATE OF ALASKA'S RECOMMENDED STRATEGY FOR MITIGATING ADVERSE IMPACTS OF OIL AND GAS EXPLORATION AND PRODUCTION IN THE 1002 AREA OF THE ANWR IS BASED ON A CLEAR AND DISTINCT SEPARATION OF THE EXPLORATION PHASE FOR OIL AND GAS AND THE PRODUCTION PHASE OF AN OIL OR GAS FIELD OF COMMERCIAL SIZE. OUR RECOMMENDATIONS FOLLOW:

(1) WE HAVE REQUESTED THAT THE DOI PREPARE SEPARATE TERMS AND CONDITIONS FOR THE EXPLORATION AND PRODUCTION PHASES. WE BELIEVE THAT WITH SEASONAL CONSTRAINTS ON EXPLORATION ACTIVITIES (E.G., WINTER DRILLING WITH SOME ALL-SEASON ACTIVITY) MOST OF THE POTENTIAL ADVERSE EFFECTS OF OIL AND GAS EXPLORATION CAN BE MITIGATED EFFECTIVELY.

IN CONTRAST, IF OIL AND GAS ARE FOUND IN QUANTITIES SUFFICIENT FOR PRODUCTION, THE POTENTIAL FOR IMPACTS TO FISH AND WILDLIFE AND THEIR HABITATS ARE ORDERS OF MAGNITUDE GREATER. PRODUCTION OF OIL AND GAS WILL THEREFORE REQUIRE A SUBSTANTIAL NUMBER OF ADDITIONAL STEPS TO ENSURE ADEQUATE ENVIRONMENTAL PROTECTION.

(2) OUR STRATEGY FOR ENSURING EFFECTIVE MITIGATION OF ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES INVOLVES TWO BASIC CONCEPTS. FIRST, THE ESTABLISHMENT OF A JOINT STATE/FEDERAL PROGRAM COVERING THE FOLLOWING PHASES OF OIL AND GAS EXPLORATION AND PRODUCTION IS REQUIRED:

(a) PROJECT PLANNING INCLUDING NECESSARY FIELD STUDIES;
(b) A TECHNICAL ANALYSIS OF PROPOSED DESIGNS, PLANS, AND PROCEDURES (I.E., DESIGN REVIEW);
(c) PERMITTING;
(d) FIELD MONITORING; AND
(e) COMPLIANCE.

SECOND, DEVELOPMENT OF EFFECTIVE ENVIRONMENTAL MITIGATION FOR THE PRODUCTION PHASE OF OIL AND GAS DEVELOPMENT IS NEEDED.

IN ORDER TO WORK EFFECTIVELY WITH THE OIL AND GAS INDUSTRY, A JOINT STATE/FEDERAL INTERDISCIPLINARY TEAM WOULD OVERSEE AND PARTICIPATE IN PROJECT PLANNING, PROJECT DESIGN REVIEW, PERMIT ACTIONS, FIELD MONITORING, AND COMPLIANCE. IN ALL ASPECTS OF THIS PROCESS, IT IS ESSENTIAL THAT STATE AND FEDERAL REGULATORY AGENCIES MAINTAIN THEIR OVERSIGHT RESPONSIBILITY WHILE WORKING COOPERATIVELY AND CLOSELY WITH THOSE PARTIES RESPONSIBLE FOR OIL- AND GAS-RELATED ACTIVITIES. AS RESEARCH RESULTS BECOME AVAILABLE IN THE FUTURE, THIS GROUP WOULD INCORPORATE APPROPRIATE CONCLUSIONS IN PROJECT PLANNING AND APPROVALS. PROGRAMS FOR ENSURING PROTECTION OF FISH AND WILDLIFE RESOURCES AND HABITATS EXIST AND HAVE BEEN USED SUCCESSFULLY IN ALASKA FOR LARGE SCALE DEVELOPMENT PROJECTS SUCH AS THE TRANS-ALASKA PIPELINE SYSTEM AND THE PRECONSTRUCTION PHASE OF THE ALASKA NATURAL GAS TRANSPORTATION SYSTEM.

DEVELOPMENT OF EFFECTIVE MITIGATION METHODS AND PROCEDURES IS A PROCESS THAT WILL CONTINUE AS LONG AS THERE IS OIL AND GAS ACTIVITY. A NUMBER OF GENERAL RECOMMENDATIONS ALREADY HAVE BEEN MADE BY THE STATE OF ALASKA BASED ON ADF&G'S MITIGATION POLICY AND EXPERIENCES WITH NORTH SLOPE OIL AND GAS EXPLORATION AND PRODUCTION IN SUCH AREAS AS THE NATIONAL PETROLEUM

RESERVE-ALASKA AND IN OIL PRODUCING FIELDS SUCH AS PRUDHOE BAY, MILNE POINT, ENDICOTT, KUPARUK, AND LISBURNE.

THE ADF&G HAS BEEN INVOLVED IN GATHERING BIOLOGICAL INFORMATION IN ANWR FOR THE LAST SIX YEARS. OUR GAME BIOLOGISTS HAVE WORKED COOPERATIVELY WITH THE USFWS SINCE 1981 ON BASELINE BIOLOGICAL STUDIES. PERSONNEL FROM THE DIVISION OF SUBSISTENCE HAVE CONDUCTED RESEARCH IN THE KAKTOVIK AND ARCTIC VILLAGE AREAS DOCUMENTING RESOURCE USE PATTERNS OF INDIVIDUALS LIVING IN THESE AREAS. THESE EFFORTS ON THE PART OF ADF&G PERSONNEL CONTINUE TODAY IN THE ANWR 1002 AREA, AND OUR HABITAT BIOLOGISTS HAVE BEEN INVOLVED WITH LARGE SCALE CONSTRUCTION PROJECTS THROUGHOUT ALASKA INCLUDING THE PRUDHOE AND KUPARUK OIL FIELD COMPLEXES. WE HAVE ANALYZED THE INFORMATION ON FISH AND WILDLIFE RESOURCES IN THE ANWR, IDENTIFIED SIGNIFICANT DATA GAPS, AND RECOMMENDED MITIGATIVE MEASURES IN LIGHT OF OUR EXPERIENCES WITH NORTH SLOPE OIL AND GAS PRODUCTION AND OTHER OIL-RELATED DEVELOPMENTS WITHIN THE STATE.

IN THE SPRING OF 1986, THE ADF&G EVALUATED THE AVAILABLE RESOURCE INFORMATION FOR THE 1002 AREA AND IDENTIFIED HABITATS OF SPECIAL CONCERN. SPECIFIC EMPHASIS WAS PLACED ON KEY SPECIES IN THE 1002 AREA SUCH AS CARIBOU, MUSKOXEN, ARCTIC CHAR, SNOW GEESE, AND POLAR BEARS. BASED ON THIS EVALUATION, RECOMMENDATIONS WERE MADE TO THE DOI FOR THE MITIGATION OF POTENTIAL ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES, THEIR HABITATS, AND USES OF THESE RESOURCES FOR SUBSISTENCE PURPOSES. NOTABLE AREAS OF CONCERN INCLUDED THE FOLLOWING:

(1) THE "CORE CALVING AREA" OF THE PORCUPINE CARIBOU HERD;

(2) A THREE MILE BUFFER ZONE ALONG THE COAST USED BY VARIOUS SPECIES OF WATERFOWL, CARIBOU, AND POLAR BEARS;

(3) FRESH WATER SPRING AREAS SUPPORTING OVERWINTERING FISH;

(4) THE NEARSHORE MARINE ENVIRONMENT USED BY ANADROMOUS FISH AND WATERFOWL DURING THE SUMMER MONTHS; AND

(5) RIPARIAN HABITATS ALONG MAJOR STREAM SYSTEMS.

MITIGATIVE MEASURES FOR THESE HABITATS WERE RECOMMENDED TO ENSURE THE PROPER PROTECTION OF THE VARIOUS FISH AND WILDLIFE SPECIES THAT USE THESE HABITAT TYPES. UTILIZING THIS INFORMATION, WE RECOMMENDED GENERAL APPROACHES TO EFFECTIVE MITIGATION, AS WE DEEMED IT PREMATURE TO PROVIDE RECOMMENDATIONS ON A SITE-SPECIFIC BASIS. IN RECOMMENDING THESE MITIGATIVE MEASURES, WE GAVE DUE CONSIDERATION TO THE FACT THAT CERTAIN ACTIVITIES AND FACILITIES ASSOCIATED WITH PRODUCTION WOULD BE NEEDED IN SOME OF THESE IMPORTANT HABITATS. IN THESE PARTICULAR CASES, THE RECOMMENDATIONS MADE WERE BALANCED WITH KNOWN REQUIREMENTS OF OIL AND GAS EXPLORATION AND PRODUCTION. ALTHOUGH THESE MEASURES WOULD MITIGATE MANY OF THE EFFECTS OF EXPLORATION AND DEVELOPMENT, IT SHOULD BE NOTED THAT SOME EFFECTS CANNOT BE FULLY MITIGATED.

TO ILLUSTRATE HOW THE PROCESS MIGHT WORK IN THE 1002 AREA OF THE ANWR, WE WILL DISCUSS A HABITAT OF SPECIAL CONCERN - STREAM SYSTEMS AND ASSOCIATED RIPARIAN HABITATS - COUPLED WITH AN EXPLORATION AND PRODUCTION ISSUE - INDUSTRIAL REQUIREMENTS FOR TREMENDOUS QUANTITIES OF GRAVEL AND WATER. THIS IS BUT ONE OF THE ENVIRONMENTAL ISSUES THAT WILL HAVE TO BE ADDRESSED IF PORTIONS OF THE 1002 AREA OF ANWR ARE LEASED - EXAMPLES OF SOME OTHER ISSUES ARE DISCUSSED BRIEFLY IN ENCLOSURE II.

BASED ON RESOURCE INFORMATION CURRENTLY AVAILABLE FOR THE 1002 AREA, THE ADF&G DETERMINED THAT STREAM SYSTEMS AND

THEIR ASSOCIATED RIPARIAN HABITATS WERE OF MAJOR IMPORTANCE TO MANY FISH AND WILDLIFE SPECIES. MOOSE ON THE NORTH SLOPE OCCUR ALMOST EXCLUSIVELY IN RIPARIAN HABITATS, POLAR BEAR DENS FREQUENTLY ARE LOCATED IN AREAS OF DRIFTED SNOW SUCH AS CUTBANKS ALONG LOWER PORTIONS OF THE RIVERS, MAJOR NORTH/SOUTH MOVEMENT CORRIDORS FOR CARIBOU AND MUSKOXEN OCCUR ALONG RIPARIAN HABITATS, SHOREBIRD AND PASSERINE DENSITIES AND DIVERSITIES ARE HIGHEST IN STREAM SYSTEMS AND ASSOCIATED RIPARIAN HABITATS, AND FISHERIES RESOURCES (E.G., ARCTIC CHAR, ARCTIC GRAYLING, WHITEFISH) ARE DEPENDENT ON THESE SYSTEMS. BASED ON THESE RESOURCE VALUES WE RECOMMENDED THAT THESE AREAS BE AFFORDED THE NECESSARY DEGREE OF PROTECTION AND THAT ALL OIL AND GAS FACILITIES WHICH CAN BE MOVED BE PLACED OUTSIDE OF A 3/4 MILE BUFFER ADJACENT TO THE MAJOR RIVER SYSTEMS.

CONSTRUCTION OF FACILITIES WITHIN ANWR OR BETWEEN ANWR AND THE TRANS-ALASKA PIPELINE SYSTEM WOULD OCCUR OVER PERMAFROST SOILS. CURRENT CONSTRUCTION TECHNIQUES REQUIRE THAT ALL STRUCTURES BE PLACED ON GRAVEL PADS WITH A NOMINAL THICKNESS OF FIVE FEET TO PROVIDE ADEQUATE INSULATION, THEREBY PREVENTING THAW DEGREDATION OF UNSTABLE SOILS. ROADS CONNECTING ALL MAJOR OIL AND GAS FACILITIES AND CAUSEWAYS IN THE NEARSHORE ENVIRONMENT ALSO REQUIRE SIGNIFICANT VOLUMES OF MINERAL MATERIAL. WATER REQUIREMENTS ASSOCIATED WITH ICE ROAD AND PAD CONSTRUCTION, HYDROTESTING OF PIPELINES, DRILLING, SAFETY, AND DOMESTIC WATER REQUIREMENTS ARE SIGNIFICANT, AND GREATLY EXCEED THE AMOUNT OF FREE WATER AVAILABLE IN THE ANWR 1002 AREA DURING THE WINTER MONTHS. THE VOLUME OF WATER IN RIVER SYSTEMS PEAKS DURING SPRING RUNOFF AND AFTER SUMMER STORMS BUT DIMINISHES TO ZERO DURING THE LONG WINTER MONTHS WITH THE EXCEPTION OF SPRING AREAS FED BY GROUNDWATER. ISOLATED DEEP POOLS MAY OCCUR WITHIN SOME OF THE MAJOR RIVER SYSTEMS SUCH AS THE CANNING RIVER. INADEQUATE WATER RESERVES EXIST WITHIN ANWR TO SUPPORT LARGE SCALE EXPLORATION OR PRODUCTION ACTIVITIES.

AT THE PRESENT TIME IN THE OILFIELD AROUND PRUDHOE BAY, GRAVEL IS OBTAINED FROM LARGE MINE SITES (SURFACE AREA OF 40 TO 100 ACRES WITH A MINING DEPTH OF 35 TO 70 FEET) LOCATED BOTH WITHIN AND ADJACENT TO STREAM SYSTEMS. DURING THE LAST SEVEN YEARS, GRAVEL REMOVAL DIRECTLY FROM ACTIVE FLOODPLAIN AREAS HAS BEEN DISCOURAGED BY RESOURCE AGENCIES DUE TO A LACK OF FIELD SURVEILLANCE AND COMPLIANCE AND THE NEED TO ESTABLISH WATER RESERVOIRS. NEW GRAVEL SITES HAVE BEEN LOCATED IN WETLAND AREAS ADJACENT TO STREAM SYSTEMS. FOLLOWING COMPLETION OF MINING AT SPECIFIC GRAVEL SITES, THE MINED-OUT SITES HAVE BEEN FLOODED WITH WATER DURING THE BREAKUP PERIOD AND HAVE BEEN CONVERTED INTO WATER RESERVOIRS. RECENT WORK BY THE ADF&G AT SEVERAL OF THESE INUNDATED GRAVEL SITES INDICATES THAT WITH PROPER SITE RESTORATION AND CONTROL OF WATER USE, SOME NET BENEFIT TO SELECTED FISH AND WILDLIFE SPECIES MAY BE ATTAINABLE. TO DATE, HOWEVER, NO MATERIAL SITES IN THE PRUDHOE BAY AREA HAVE BEEN RESTORED IN SUCH A MANNER THAT THEY PROVIDE SUITABLE HABITAT FOR FISH AND WILDLIFE.

THE STATE OF ALASKA RECOGNIZED, AS DID DOI, THAT PIPELINES AND ROADS WOULD HAVE TO CROSS THESE MAJOR STREAMS AND RIPARIAN HABITATS. PERFORMANCE STANDARDS ON CROSS DRAINAGE WERE DEVELOPED AND PROVIDED TO THE DOI. THESE PERFORMANCE STANDARDS WERE BASED ON EXPERIENCE GAINED DURING THE PAST DECADE OF WORK WITH OIL AND GAS ON THE NORTH SLOPE. THEREFORE, WE RECOMMENDED THAT A COMPREHENSIVE PROGRAM BE INITIATED TO FULLY ASSESS GRAVEL AND WATER AVAILABILITY IN THE ANWR 1002 AREA, INCLUDING AVAILABILITY OF GRAVEL IN FLOODPLAIN AND RIPARIAN HABITATS. DECISIONS ON LOCATIONS OF GRAVEL SITES SHOULD NOT BE MADE WITHOUT AN ADEQUATE DATA BASE ON THE GRAVEL RESOURCES AVAILABLE IN THE VARIOUS HABITAT TYPES, THE MATERIAL REQUIREMENTS FOR EACH EXPLORATION OR PRODUCTION SCENARIO, AND THE IMPACTS OF THE VARIOUS MINE SITE ALTERNATIVES ON FISH AND WILDLIFE HABITAT.

IN THE ANWR AREA, HOWEVER, IT APPEARS THAT THE BEST LOCATION FOR AT LEAST SOME GRAVEL SITES MAY INDEED BE IN RIVER SYSTEMS. THIS SHIFT IN APPROACH IS BASED ON INFORMATION COLLECTED BY THE ADF&G ON THE NORTH SLOPE THAT INDICATES THAT SOME OF THE GRAVEL SITES THAT HAVE BEEN CONVERTED TO WATER RESERVOIRS MAY ALSO PROVIDE USABLE HABITAT FOR FISH AND OTHER WILDLIFE SPECIES. HOWEVER, TO DEVELOP GRAVEL SITES IN FLOODPLAIN ENVIRONMENTS AND CONVERT THEM TO USABLE WATER RESERVOIRS WHILE STILL PROVIDING SOME LONG TERM BENEFIT TO FISH AND WILDLIFE, WILL REQUIRE A FULL COMMITMENT ON THE PART OF INDUSTRY AND REGULATORY AGENCIES TO RESOLVE THIS ISSUE. ADVANCE PLANNING, APPROPRIATE DATA COLLECTION, AND ASSESSMENT OF THE OPTIMAL GRAVEL SITES IN TERMS OF SITE LOCATION, MINING PLANS, OPERATIONS, AND REHABILITATION WILL BE REQUIRED.

THEREFORE, WE RECOMMENDED TO THE DOI THAT ALTERNATIVE SOURCES OF WATER BE CONSIDERED, AND THAT GRAVEL SITES BE SITED, DEVELOPED, AND RESTORED IN A MANNER SUCH THAT OVERALL IMPACTS TO WATER QUALITY AND FISH AND WILDLIFE RESOURCES ARE MITIGATED. A POSSIBLE APPROACH TO SUCH A RESOLUTION FOLLOWS.

> A JOINT STATE/FEDERAL INTERDISCIPLINARY TEAM WORKING WITH INDUSTRY SHOULD IDENTIFY ALTERNATIVE APPROACHES FOR THE ACQUISITION OF LARGE QUANTITIES OF WATER AND GRAVEL, INCLUDING NEEDED FIELD STUDIES. SUBSURFACE GEOTECHNICAL STUDIES TO IDENTIFY GRAVEL RESOURCES (QUANTITIES, QUALITY, AND LOCATION) IN VARIOUS HABITAT TYPES SHOULD BE REQUIRED PRIOR TO SUBMITTAL OF INDIVIDUAL PERMIT APPLICATIONS. WORK SHOULD BE INITIATED TO DEVELOP DESIGN CRITERIA AND STANDARDS FOR THE DEVELOPMENT OF MINING PLANS INCLUDING RESTORATION OF GRAVEL SITES CONCURRENT WITH MINING OPERATIONS. MINING PLANS SHOULD BE PREPARED TO INCLUDE CONSIDERATION FOR FISH AND WILDLIFE USE FOLLOWING COMPLETION OF MINING. ALL AREAS, INCLUDING STREAM AND ASSOCIATED RIPARIAN SYSTEMS SHOULD BE CONSIDERED WITH THE OBJECTIVE OF PROVIDING GRAVEL, SUBSEQUENT WATER SITES FOR SUPPORT OF INDUSTRIAL ACTIVITIES, AND FISH AND WILDLIFE HABITAT. ASSUMING THESE ACTIONS ARE TAKEN, WE BELIEVE THAT THE ISSUE OF GRAVEL AND WATER AVAILABILITY AND MITIGATION OF EFFECTS TO FISH AND WILDLIFE RESOURCES CAN BE RESOLVED WITHOUT SIGNIFICANT ADVERSE EFFECTS TO FISH AND WILDLIFE IN THE 1002 AREA OF ANWR. WE ALSO BELIEVE THAT THE POTENTIAL EXISTS FOR PROVIDING HABITAT TO SELECTED SPECIES AS WAS DEMONSTRATED IN THE FIVE YEAR GRAVEL STUDY CONDUCTED BY A CONSULTING FIRM FOR THE USFWS.

WE HAVE FOCUSED ON AN OVERALL APPROACH TO MITIGATION OF ADVERSE IMPACTS TO FISH AND WILDLIFE RESOURCES USING WATER AND GRAVEL TO ILLUSTRATE AN EXAMPLE IN WHICH IMPACTS OF OIL AND GAS PRODUCTION COULD BE MITIGATED IF THE PROPER PROCEDURES WERE FOLLOWED. WE KNOW THAT THERE WILL BE TREMENDOUS DEMANDS FOR WATER AND GRAVEL IF EXPLORATION AND PRODUCTION OCCUR, AND WE KNOW THAT GRAVEL AND WATER SOURCES WILL HAVE TO BE DEVELOPED. WE KNOW THAT WATER IS NOT READILY AVAILABLE IN ANWR. WE ALSO KNOW THAT STREAMS AND ASSOCIATED RIPARIAN HABITATS MUST BE AFFORDED A HIGH DEGREE OF PROTECTION. USING THESE KNOWN FACTORS AS WELL AS OUR EXPERIENCES WITH OIL AND GAS DEVELOPMENT ELSEWHERE ON THE NORTH SLOPE, WE HAVE RECOMMENDED A WORKABLE APPROACH TO RESOLUTION OF THIS PROBLEM WHILE AT THE SAME TIME ENSURING AN ACCEPTABLE LEVEL OF PROTECTION FOR FISH AND WILDLIFE RESOURCES.

UNLIKE THE GRAVEL AND WATER EXAMPLE, WE DO NOT CURRENTLY BELIEVE THAT SUFFICIENT INFORMATION NOR EFFECTIVE MITIGATIVE MEASURES EXIST TO PREVENT ADVERSE IMPACTS TO THE PORCUPINE CARIBOU HERD WITHIN THE CORE CALVING AREA. AT THIS TIME, MR. KEN WHITTEN (ADF&G) WILL DISCUSS THE PORCUPINE CARIBOU HERD WITH EMPHASIS ON CARIBOU CALVING IN THE 1002 AREA.

The **Chairman**. Thank you very much, Mr. Ott. That was very good.

Next is Mr. Dietrick, Director of Environmental Quality.

STATEMENT OF LARRY DIETRICK, DIRECTOR, ENVIRONMENTAL QUALITY, ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Mr. **Dietrick**. Yes. My name is Larry Dietrick. I am Director of Environmental Quality for the Alaska Department of Environmental Conservation.

I think I could best summarize ours in approximately five points. The first one would be that we would like to see a continuation of the evaluation of the past waste management practices at Prudhoe Bay, and this is for purposes of planning, which is the second point I would like to make:

For effective waste disposal, the selection of the best waste disposal technology in the new area or in the ANWR area, a careful evaluation with a good assessment that would yield proper planning process and should result in the development of specific effective stipulations to guide the development through both the exploratory and development stages in ANWR.

The development of the specific stipulations I believe would be the third step.

The fourth step I think that we need then is the process by which this would happen, and the process that I think we feel this should happen should be a very strong joint coordinated State-Federal monitoring team, both to develop these stipulations and to oversee the planning.

I do not think at any single point in time you are going to be able to conclusively say, here is the set of stipulations by which everyone should comply. The regulatory changes that occur with time, the technological changes that occur with time, virtually dictate that you have to have a certain amount of flexibility to accommodate both those kinds of changes.

And the fifth point then, monitoring of the impacts. If you do have a good coordinated State-Federal team, that should be backed up with a good monitoring effort in the field. Hopefully, that monitoring effort would be an extension of that team's responsibilities.

And I think those would be our major points.

[The prepared statement of Mr. Dietrick follows:]

TESTIMONY OF LARRY DIETRICK
BEFORE THE SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
October 13, 1987

Mr. Chairman and Members of the Committee:

My name is Larry Dietrick. I am Director of the Alaska Division of Environmental Quality of the Alaska Department of Environmental Conservation.

The Department of Environmental Conservation is responsible for protecting public health and the environment. We enforce regulations governing air quality, water pollution control, solid waste management, hazardous waste management, and oil spill prevention and response. We write permits specifying emission levels and disposal methods, monitor activities under permits, and take enforcement actions when needed. The Department has considerable experience with the effects of oil and gas related activities.

On Alaska's North Slope, the Department has developed stipulations for oil and gas lease sales, helped with siting of disposal facilities, and carried out the full range of environmental protection activities. We also participate in the design and review of environmental studies, collect monitoring data, and maintain a field office at Prudhoe Bay in Deadhorse.

Effective waste stream management for oil and gas activities in the Arctic National Wildlife Refuge (ANWR) requires the following steps:

1. Evaluation of past practices and operating procedures at other fields on the North Slope.
2. Advance planning for effective waste disposal facilities and practices.
3. Development and application of specific, effective requirements for industry as lease stipulations and permit conditions.
4. Coordination of efforts among agencies with authority to regulate oil and gas exploration and development.
5. Monitoring of impacts and compliance with environmental requirements.

I will briefly discuss each of these steps and will illustrate them with examples drawn from our experience with solid waste management. In addition to solid waste, key areas for adequate environmental protection measures include air quality, liquid wastes, hazardous wastes, spill prevention and response, and area of impact. I have included an overview of these issues as an attachment to my written testimony.

REVIEW OF WASTE MANAGEMENT PRACTICES IN ALASKA'S NORTH SLOPE OIL FIELDS

Decisions on the exploration and development of ANWR should reflect the experience and information gained by the State and the industry during operations at the National Petroleum Reserve in Alaska (where exploration began in the mid 1940's), Prudhoe Bay (where exploration confirmed the field in the late 1960's), Milne Point, Lisburne, Endicott, and the Kuparuk River oil fields. The technology and operating methods used in oil and gas development have evolved considerably since the early days of Prudhoe Bay. Both the industry and the agencies have learned a great deal in the process. Operations in the newer fields at Endicott and Kuparuk differ substantially from those at Prudhoe. Some waste disposal practices have proven effective while others can and should be improved.

The Department is currently reviewing North Slope waste disposal practices. A technical accounting of these practices, a description of their evolution, and an assessment of potential impacts will help identify the most appropriate management regime for each waste stream for ANWR.

Moreover, there is a role for Congress in designing the waste stream management regime for ANWR by setting the standards to be met. If Congress concludes that some areas of ANWR warrant a particularly high degree of environmental protection, it may be appropriate, for example, to require removal of wastes from those areas. The level of protection deemed necessary by Congress can best be met through lease stipulations or permit conditions, evaluation of the effectiveness of these measures, and modification of the requirements if field experience warrants.

The State's waste stream management requirements have evolved in response to the North Slope oil development experience. During the past year the State developed new regulations for handling solid waste, particularly drilling muds. Those regulations are now in effect. They establish requirements for disposal of drilling muds and for water quality monitoring to ensure that the disposal techniques used will protect the environment.

PLANNING FOR ADEQUATE WASTE STREAM MANAGEMENT

Planning before start-up is essential for proper management of waste streams in ANWR. Inadequate planning before start-up was a major reason why some North Slope development occurred without the best technology. Similarly, inadequate planning led to the absence of sufficient waste disposal facilities for the oil field support industry, which does not have access to the same disposal facilities as the field operators. This has contributed to the abandonment of drums and dumping of other waste materials on vacant sites in the Deadhorse area.

Solid waste management provides numerous examples of the advantages of careful planning for disposal facilities and methods. Major sources of solid waste are garbage, drilling wastes, scrap metal, oily wastes, construction debris, drums, junked vehicles, tires and a host of other materials. Comprehensive waste material management plans could minimize the amount of waste and incorporate salvaging, reusing, and recycling as waste management tools. Backhauling scrap metal and crushed drums is an additional technique which could make most landfills in ANWR unnecessary. Ash and residue from incinerator operation could easily be consolidated into a single facility.

Comprehensive planning could also lead to regional disposal facilities. This would prevent unnecessary proliferation of landfills while enabling the support service industry to have access to proper disposal facilities. Ultimate disposal of pipelines, flow stations, camps, and related facilites should also be addressed at the outset of ANWR planning so that a financial mechanism is in place to provide for proper disposal upon completion of use.

Plans for management of drums should be required as a condition of operation. They should include inventory and tracking, cleaning, crushing, backhaul, and disposal of waste liquids or residues from cleaning.

PERMIT CONDITIONS AND LEASE STIPULATIONS

Stipulations placed in leases and conditions written into permits provide a means to address site-specific factors. Lease stipulations apply to the tracts to be explored and developed; they should be tailored to the conditions found there. An example of a solid waste issue that could be addressed by stipulation is the collection of litter and other debris.

Litter, including construction materials and other debris, can be a persistent problem near the arctic coast where flat terrain and strong winds combine to carry these materials considerable distances. Once "offsite", it is often difficult to determine their source. Consequently, it may be desirable to implement a "no fault" requirement in stipulations applied to successful tract bidders, so that litter and other debris are routinely collected regardless of their origin.

Permits are written to govern specific activities of the permit applicant, often in a particular location. They are useful in fine tuning the waste stream management system and in preventing undesirable side effects of disposal. For example, solid waste disposal facilities such as landfills require a permit from the Alaska Department of Environmental Conservation. By taking account of the site configuration and other circumstances, conditions written into the permit can help prevent air and water pollution which might otherwise result from an improperly placed or operated landfill. However, the site-specific characteristics of most permits also limit their ability to deal with area-wide problems involving many different activities. Waste management problems often affect large areas and several operators or industries. Consequently, permits are no substitute for area-wide planning for disposal needs.

Effective use of lease stipulations and permit conditions requires flexibility. Otherwise, new circumstances may undercut their appropriateness. Changes in available technology, legal requirements, or new scientific data may dictate corresponding changes in the way a particular waste is managed. In order to determine whether stipulations or permit conditions are having the intended effect, it is also necessary to monitor on a continuing basis.

COORDINATION AND REVIEW

To achieve the optimum level of environmental protection, State and Federal agencies and industry must coordinate their efforts. They must share data in order to ensure that the best available information is brought to bear on ANWR waste management issues. Agency requirements should also be consistent and flexible enough to respond to changing circumstances. Congress should establish a formal consultation process involving these parties. If developed properly, this would also allow the opportunity for the participating agencies to clarify their respective authorities and to avoid duplication.

Among the issues which this process would address are the timing of the various phases of development; the need for studies; and the coordination of permitting, operating plan reviews, field monitoring, and field approvals. In all aspects of this process, it is essential that State and Federal regulatory agencies maintain their own oversight responsibilities.

MONITORING

Monitoring provides data to evaluate the effectiveness of permit conditions and lease stipulations. It may demonstrate the need to modify environmental requirements or operating methods and may help identify areas where additional study is needed. Monitoring also allows a determination of whether operations are in compliance with these requirements and with other environmental standards. For example, data from water quality monitoring under the new drilling mud disposal regulations will show whether contamination is occurring. If it is, the regulations require corrective measures.

CONCLUSION

Governor Cowper has taken a firm position that ANWR exploration and development must be done right, that the environment and the special values of ANWR must be protected. I have outlined some of the steps that can be taken to achieve this goal. These are just highlights, of course. Oil and gas development in the Arctic is a complicated business and I have only touched on the major environmental issues to be addressed.

Mr. Chairman, the Department of Environmental Conservation is available to the members and staff to discuss the details of environmental matters affecting your decision about ANWR. Thank you for the opportunity to testify. We look forward to working with you.

Attachment

SUMMARY OF WASTE STREAM MANAGEMENT AND OTHER ENVIRONMENTAL PROTECTION ISSUES RELEVANT TO OIL AND GAS DEVELOPMENT IN THE ARCTIC NATIONAL WILDLIFE REFUGE

AIR QUALITY

The principal air pollutants discharged during oil and gas development are sulphur dioxide, suspended particulate matter, carbon monoxide, and nitrogen oxides. Concentrations of these four types of emissions depend, in large part, on the type and volume of fuel burned in the turbines, generators, and other internal combustion engines, the and the amount of flaring in the area.

Flaring is a significant contributor to visibility impairment. Flaring during exploratory flow testing and operational phases is potentially a major source of emission of soot -- primarily unburned hydrocarbons -- and other materials. Technology exists to prevent such problems in future developments.

The primary source of NOx at Prudhoe Bay is the more than 100 gas turbines, each rated at more than 10,000 horsepower. This may be the greatest concentration of large turbines in the world. Approximately 20 air quality permits have been issued, and three are pending. The cumulative annual discharge allowed under these permits is more than 90,000 tons of NOx. Actual emissions are approximately 70 to 90 percent of the permitted values. Modeling has been used to predict the ground level concentrations of NOx and ground level monitoring is now underway to verify the modeling effort and measure ambient levels.

LIQUID WASTE MANAGEMENT

Liquid waste discharges include domestic wastewater, reserve pit fluids, brine discharges, hydrostatic test discharges, vessel rinsates, radiographic wastes, excavation discharges, oily wastewater streams, equipment washing runoff, workover fluids, waste oil solvents, and a wide range of other wastewater streams. Each needs to be identified with a provision made for proper disposal.

Zero discharge of non-domestic (industrial) wastewater streams, with the possible exception of excavation dewatering, should be carefully considered for ANWR. Based upon current experience on the North Slope, alternatives to dewatering of reserve pits should be used in ANWR. The management regime selected for drilling wastes could eliminate the need to discharge to the tundra or roads. Conventional dust control measures or water should be used instead of wastewater. The planning stage should identify specific disposal methods for liquid waste streams classified under the Federal Resource Conservation and Recovery Act (RCRA) and non-RCRA liquid oily-waste streams. Rinsates from tank, vessel and truck cleaning also must be disposed properly. Consequently, both the oil field operators, and the oil field support service industry must have access to appropriate facilities. Underground injection, potentially an acceptable disposal solution for many of these waste streams, should be considered. Produced water disposal should be limited to subsurface techniques.

Unlined gravel impoundments have been used in other North Slope oil and gas developments to contain various wastewater streams. This technique may not be appropriate in ANWR because of its limited effectiveness and its requirement for large amounts of gravel.

Comprehensive planning is needed to ensure that liquid waste disposal solutions are available for all users. This would allow all liquid waste streams to be accurately identified, characterized, and quantified along with an acceptable method for disposal. For example, subsurface disposal options should be available for use by the support service industry.

SOLID WASTE MANAGEMENT

Major sources of solid waste are drilling wastes, scrap metal, oily wastes, construction debris, drums, junked vehicles, tires and a host of other materials. It is critical that proper management of all these wastes be addressed from the beginning. Drilling wastes are of particular concern. The State's new regulations governing drilling waste disposal provide an appropriate starting point.

Disposal of solid waste is another area for which careful planning can lead to development of proper facilities at the outset. Provisions for picking up "off-site" litter and other debris should be addressed by stipulation placed on successful tract bidders. Because it is often difficult to determine the source of off-site litter or debris, it may be desirable to implement a "no fault" policy by which litter and debris are routinely collected regardless of origin.

Plans for management of drums should be required as condition of operation. They should include inventory and tracking, cleaning, crushing, backhaul and disposal of waste liquids or residues from cleaning.

Garbage and other wastes which may attract wildlife should be incinerated. Collection and storage of such wastes must also avoid attracting wildlife. Plans for collection of these wastes and for central incineration should be prepared and adopted as a condition of field exploration and development.

Disposal methods for solid oily wastes from tank bottoms, sludges, hydrocarbon waxes, oil contaminated muds and cuttings and spill debris require very careful evaluation. At Prudhoe, the North Slope Borough operates one of two permitted non-RCRA solid oily waste disposal sites in Alaska. Results from the operation of this site are mixed.

Additional work and technology review are needed to develop acceptable solutions for this very difficult waste stream management issue. Incineration would provide the most reliable and complete solution to the problem. However, this is also more costly to the operators.

Comprehensive waste material management plans could minimize the amount of waste to be disposed and could incorporate salvaging, reusing, and recycling materials. Backhaul of scrap metal and crushed drums are additional tools which could make most landfills in ANWR unnecessary. Ash and residue from incinerator operation could easily be consolidated into a single facility.

Comprehensive planning to develop solutions for solid waste disposal must also enable the support service industry to have access to proper disposal options. Regional disposal facilities can also help prevent unnecessary proliferation of landfills. Ultimate disposal of pipelines, flow stations, camps and related facilities should be addressed at the outset of ANWR planning so that a financial mechanism is in place to provide for proper disposal upon completion of use.

HAZARDOUS WASTE MANAGEMENT

Hazardous waste management is governed by stringent requirements under the Federal Resource Conservation and Recovery Act (RCRA). Transportation of hazardous substances is regulated by the Federal Department of Transportation. The State has adopted hazardous waste regulations and is currently in the process of implementing them through a cooperative agreement with the Environmental Protection Agency.

As with other waste streams, it is essential that acceptable disposal methods be available both to the oil field operators and to the support service industry. Comprehensive planning is needed to develop appropriate management facilities at the outset.

OIL SPILL PREVENTION AND RESPONSE

Coordinated response capability should be required. Adequate oil spill contingency plans and secondary containment requirements for drums and small facilities are also important. Buffer zones should be established to isolate these facilities from sensitive areas.

If field gas or refining capacity is available to supply fuels it should be made available to the support service industry. This will significantly reduce the occurrence of spills by eliminating fuel storage and piping for space heating and electrical generation. Local availability of refined products to all users would eliminate haul road tanker spills.

AREA OF IMPACT

Many of the tools developed in other North Slope fields are directly applicable to minimize the "footprint" of individual drill sites and of the overall production effort. Appropriate facility siting criteria and buffer distances will also help maintain adequate levels of environmental protection.

Development plans should include the following: a design to minimize the number of drill sites and production facilities while optimizing the layout of roads and pipelines; provisions for a limited number of intensive use material sites; and plans to centralize and consolidate support facilities. Consolidation of the service industry at Kuparuk provides an example of centralized support services in planning for ANWR.

Ice pads should be considered for all exploratory drilling. Ice pads may also be used for temporary stockpiling of overburden and muds and cuttings.

Restoration of the site at each stage from exploration through production can reduce the cumulative impact of development activities. Adequate drainage must be provided for all facilities to prevent impoundments.

The CHAIRMAN. Thank you very much, Mr. Dietrick.

Finally, Bill Van Dyke, who is Petroleum Manager of the Division of Oil and Gas.

STATEMENT OF WILLIAM D. VAN DYKE, PETROLEUM MANAGER, DIVISION OF OIL AND GAS, ALASKA DEPARTMENT OF NATURAL RESOURCES

Mr. VAN DYKE. Mr. Chairman, members of the committee, my name is Bill Van Dyke, Petroleum Manager in the Alaska Department of Natural Resources. I would like to cover two points.

First, given our 20 years experience in Prudhoe Bay, we think both exploration and development can go forward on the coastal plain. It has really been the hundreds of little things we have learned that are going to allow this. There have not been that many giant revelations. It is really the hundreds of little things that are going to make this possible as far as the design and implementation of the mitigating measures.

Second, the State does not support the exploration-only option for ANWR. I think the actual outlay of public funds, the lost revenues and bonuses in leasing, I do not think exploration-only supports that.

There are going to be land management conflicts with the adjacent landowners. Acreage can be condemned, and other landowners are going to want to protect their interests, the State and the native corporations. And I do not think that you will get a fair evaluation of the geologic potential.

Interior has identified 26 prospects, the State has identified other prospects. I am sure industry has their own idea of where they would like to drill. I think it would take dozens of wells to really evaluate the geologic potential of the coastal plain.

And if you want to drill that many and pay for that many, that is fine. But otherwise, I do not think it is fair to the potential of the coastal plain to go out and drill a few and maybe false condemn it.

Thank you.

Senator MURKOWSKI. And what?

Mr. Van Dyke. To maybe falsely condemn the oil and gas potential. If you drill two or three dry holes, do not assume that it is over with.

[The prepared statement of Mr. Van Dyke follows:]

TESTIMONY OF
WILLIAM D. VAN DYKE
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
October 13, 1987

Mr. Chairman, and members of the Committee:

My name is William D. Van Dyke. I am a petroleum engineer with nine years of experience in Alaska. I serve as Petroleum Manager for the Division of Oil and Gas in the Department of Natural Resources. I am actively involved in the permitting of oil and gas activities on State lands, unitization of State oil and gas leases, and design of the terms and conditions attached to State oil and gas leases at the time of sale. I also have been very involved in developing the State position concerning proposed leasing of the coastal plain of the Arctic National Wildlife Refuge (ANWR).

Before discussing the details of possible ANWR development strategies and specific mitigation measures, I would like to stress four very important points. First, oil and gas leasing in Alaska is extremely important to both the State and the nation. Second, from the information I have seen, I am convinced that the coastal plain of ANWR is the most prospective unexplored petroleum province remaining in North America. Third, given what we have learned from our years of experience at Prudhoe Bay and along the TAPS line, I believe that oil and gas development can take place in ANWR with a minimal degree of impact to the environment. And fourth, an exploration-only policy should not be considered for ANWR.

The manner in which State North Slope oil and gas lessees conduct their business has certainly evolved since what might be termed the "early years" at Prudhoe Bay. Government agencies' understanding of North Slope oil field operations and of the arctic environment have likewise matured. Summertime cat trains over the tundra and long gravel airstrips at each and every exploratory well site are now only stories of the past. Large balloon-tired vehicles, ice roads and comprehensive planning reflect the technologies and tools of today.

We do not know everything that there is to know about the environment and the ecology of the coastal plain. Year by year our understanding of these matters is growing, and we are developing better and more effective mitigation techniques. Certainly that trend will continue in the future. We have seen a progression from the first development at Prudhoe Bay and TAPS construction in the 1970's to the more recent developments at the Kuparuk, Milne Point, Lisburne and Endicott fields. The improvements reflect the incremental knowledge and experience gained. What has been learned at these fields can be applied to future activities on the coastal plain.

Let me cite a few examples of the advances that have been made:

1. Typically, on the North Slope, numerous development wells are drilled from a single gravel pad. At Prudhoe Bay, the original development wells were about 120 feet apart from each other. At the Kuparuk Field and at Lisburne the wells are about 60 feet apart. At the new offshore Endicott field, those wells are only 10 feet apart, but this requires a specially modified drill rig. Overall, this closer well spacing means that drill sites can be much smaller for a

given number of wells; overall utilization of gravel is reduced and fewer square feet of tundra are covered.

2. Significant advances have also been made in 3-D seismic interpretation, directional drilling technology, and Measurement While Drilling (MWD) technology. Again, fewer drill sites may be needed, and the sites can be optimally located. Having some flexibility in being able to move the drill site allows sensitive habitats to be avoided, while at the same time the subsurface reservoirs can be properly developed and produced.

3. Development and operation of giant oil fields requires wide-ranging support activities. Drilling mud and cement companies, construction contractors, well service operators, and the like, are all a necessary part of the day-to-day operation. As with the actual in-field operations, we are now much more experienced in planning for the needs of the service companies. The Kuparuk River Oil Field, with its associated Kuparuk Industrial Center, is a contemporary example of how to plan and permit these types of activities. We made some early mistakes at Prudhoe Bay, but we learned from those mistakes.

Certainly development of oil and gas on the coastal plain will require some trade-offs. However, relative to what might have been required even just 10 years ago, the magnitude of those trade-offs has been significantly diminished and in some cases even eliminated. Through a combination of innovative thinking, close observation of the actual effects caused by development, and pure scientific study, we are in a position today to say oil exploration and development can proceed in ANWR without significant adverse impact.

I believe an exploration-only policy in ANWR would be a big mistake for this country.

An exploration-only policy would cost the Federal government a lot of money. These costs would take several forms. The operation of an exploratory program would result in sizeable out-of-pocket government expenditures. Secondly, the government would forego lease and bonus revenues. And thirdly, such a program could effectively condemn adjacent acreage, and the attendant revenues that could flow from that property.

The National Petroleum Reserve (NPRA) is a prime example of a government-sponsored exploration program and the problems inherent in such a program. Between 1923 and 1953 the United States Navy drilled 37 test wells and found three oil accumulations and six gas accumulations within the NPRA. Only two of these discoveries were considered sizeable. This 30-year exploration effort cost the Federal government between $50 and $60 million.

In 1974, exploration began again in the NPRA, this time under the direction of the U.S. Geological Survey. Between 1974 and 1981 twenty-seven exploratory wells were drilled within the NPRA at a cost to the Federal government just over a half billion dollars. After the Federal exploration program ended, Congress authorized competitive leasing in NPRA, and three sales were held. The first two of these sales received minimal interest, and the third received no bids.

If the NPRA had been leased under a traditional competitive leasing program not only would it likely have generated millions of dollars of bonus revenues, but the exploration costs would have been borne by the oil industry.

Additionally, an exploration-only policy raises a number of technical issues. One issue is how many wells are necessary to confirm (or condemn) the region's resource potential. In the ANWR coastal plain, where the subsurface geology is extremely complex, it will require a very large number of exploratory wells (each at a high cost) to evaluate all the geologic plays which have the potential to yield commercial deposits. The drilling of six to 12 unsuccessful exploratory wells will not establish, with a high degree of confidence, that no commercial oil deposits exist in the 1002 area. The problem, as I see it, is that exploratory wells reveal more about the subsurface geology and oftentimes indicate additional plays and stratigraphic intervals that warrant evaluation. More questions are created than are answered. With a limited exploratory well program, the possibility exists that the area will be falsely condemned without the complete and thorough evaluation a more traditional leasing and exploration program would provide.

A traditional competitive leasing program results in many companies participating in the evaluation of different plays. One entity (the USGS, the State, or an individual company) cannot generate as many different interpretations from these data (or novel ideas for potential deposits) as a group of companies. Thus, the exploration-only proposal limits not only the number, but the types of plays that will be evaluated, further increasing the possibility that deposits could be missed.

In the case of a well (or wells) that is successful, various land management decisions and conflicts will arise related to the dispensation of the unleased lands. In most cases it requires a number of delineation wells to determine the size of a discovery--who will incur the cost of the delineation wells? How will leasing of partially known deposits be managed? These are problems that are not present with a competitive leasing regime.

With respect to the design of mitigation measures, both our leasing and permitting systems use a formal tri-agency review procedure to assure that lease sale proposals and permit applications receive a broad and a thorough review. The Alaska Department of Fish and Game (ADF&G), the Alaska Department of Environmental Conservation (ADEC), and the Alaska Department of Natural Resources (ADNR) each provide comments on the proposal. No single State agency has veto power, and conflicts between agencies are elevated--when necessary--to agency directors or commissioners for final resolution. We also solicit input from the Federal resource agencies, the oil industry and the people living in the sale area.

Given the scope and complexity of oil field operations and the broad range of environmental concerns at hand, I cannot imagine any one State or Federal agency possessing the expertise that is needed to properly review and approve all the terms of sale that might be used for the leasing of the coastal plain or. for approval of a proposal to develop a major new oil field in the coastal plain.

In my view, joint State-Federal multiagency review is a necessity at both the lease sale planning stage and during the actual permitting process. The State has also recommended joint State-Federal monitoring and enforcement teams be created. This will be essential in ANWR where Federal, State and fee ownership of subsurface mineral rights is a certainty, and permitting jurisdictions overlap.

Our terms of sale are a mixture of general performance standards and very site-specific requirements. We have taken this approach for a number of reasons. First, it is impractical to go out into the field ahead of time and gather the enormous amount of site-specific baseline data that would be needed to write detailed all-encompassing stipulations for each and every square foot of proposed lease sale area. Second, in our lease sale areas, we are not absolutely certain where the oil and gas is located and what volumes might be there. We therefore cannot anticipate ahead of time the exact location or optimum layout of roads, pipelines, well sites, etc. Because of these two factors it is best to let the potential lessees know at the time of sale the parameters within which they will be expected to operate, while we retain the flexibility later in the process to fine-tune the proposals as they are developed.

In those areas where we have more detailed information (such as along the major North Slope river systems) or for those concerns that are well recognized (such as seasonal protection of caribou calving areas), we do draft very detailed site-specific measures. If you have the studies and the data in hand, it is only fair to let the lessees know that very specific restrictions will apply in certain areas or during certain times of the year.

But in those instances where the data are sketchy or nonconclusive or if there is a choice of possible mitigation measures, I believe it is a mistake at the lease sale stage to lock in rigid stipulations that later may turn out to be ineffective or unnecessary.

Recent exploration on the Federal OCS in Alaska and on State lands has been very disappointing. Our aggregate North Slope oil reserves are about half gone, and Cook Inlet production is well past its zenith. In reality, very few giant oil fields are ever discovered, but the ones that are found account for about two-thirds of all the oil produced. Because of the development at the Prudhoe Bay, Kuparuk, Milne Point, Lisburne, and Endicott fields, we have safe, proven technology. In terms of being able to plan and design for protection of biological resources, we are over the major hurdles that a major development proposal might present.

Prudhoe Bay currently provides over 20% of this Nation's domestic production. As that area moves into decline, ANWR represents this country's best opportunity to supplement those reserves. With the 10-15 year lead time necessary for exploration and development in the Arctic, this is the ideal time to begin a competitive ANWR leasing program. The State of Alaska stands ready and willing to work with the committee as it considers this important legislation.

We will be happy to provide the specific information you need on our current North Slope leasing and permitting practices, and our ideas on specific mitigation measures for ANWR.

For the record, along with my written testimony, I have submitted copies of three of our recent State notices of sale which list sale terms and conditions representative of those used to lease State acreage adjacent to ANWR. Sale 51 was an onshore sale. Sale 50 was an offshore sale. Sale 54 is an onshore sale proposed for January 1988. The notices for sales 50 and 51 contain the complete set of sale terms and conditions the State applied. The notice for Sale 54 is still in the preliminary stage, but you can see where we are headed in terms of mitigating measures for that area. There is no need to go through those notices page by page. Rather, I believe it is important for you to understand how we arrived at the final product, and the rationale behind those sale terms.

We are submitting the first stage of a lease sale stipulation review and analysis study that the State has undertaken. The study is being done to reassess the costs and the benefits of each stipulation given the advances that have been made over the past few years.

Additionally, a summary of the different leasing methods the State currently has the authority to use is included.

Thank you for the opportunity to testify today and I will be happy to answer any questions.

LEASING, ALASKA STYLE

The 1978 amendments to AS 38.05.180 allowed for the use of net profit shares (NPS), royalty bidding, sliding scale royalties, work commitments and exploration incentive credits (EICs), as well as traditional bonus bidding with fixed royalties in the competitive leasing of oil and gas tracts. The net profit shares, bonuses, royalties and sliding scale royalties can be fixed by the department before a sale or utilized as variables in the bidding process. Since the 1978 amendments, net profit shares have been used in seven sales, all but one on the North Slope. Lease sales involving royalty bidding (royalty as the bid variable) were held in three Cook Inlet sales.

All of the NPS and royalty bid sales were held between December 1979 (Sale 30) and May of 1984 (Sales 43 and 43A). Table I summarizes the results for these nontraditional sales. Parenthetically, it should be noted that Sales 30 and 31 also contained work commitment provisions requiring the drilling of an exploratory well within five years of lease issuance. The 1979 to 1984 time period represented a period characterized by a favorable mix of geological and economic variables such that nontraditional leasing methods appeared to confer clear financial benefits to the state.

The mixture of bonus payments (up front payments) and contingency payments (royalties and net profit shares which are contingent upon commercial production) has the effect of distributing the economic and geological risk and benefits between the lessee and lessor. This distributional effect influences the incentive to explore and develop leases. The preferential use of up front payments shift risks and potential benefits from the state (lessor) to the lessee, whereas contingency payments shift some of the geological and economic risk to the lessor.

Even with substantial contingency payments and modest bonus requirements, a major risk still resides with the lessee--the cost of drilling a dry hole. Thus, there is a fundamental asymmetry between who bears costs and who receives benefits in leasing systems with substantial reliance on contingency payments. This asymmetry is a disincentive to drilling exploratory wells. The discovery of commercial hydrocarbons is extremely difficult absent the drilling of exploratory wells (impossible!). Exploration Incentive Credits were designed partially to offset this disincentive and to encourage the exploration of high risk frontier projects with unusually high costs.

These credits were used in Sales 34, 36, 37, 43, and 43A. Table II reveals the state's financial commitment to the EIC program. The Colville Delta #1 well is a "discovery", but under current market conditions it is probably noncommercial.

Since 1984 a more conservative economic environment and less favorable geologic circumstances have reduced the department's use of NPSs and EICs. Even though recent leasing has been "traditional", the state's share of potential production revenue would approximate 30% when royalties, severance taxes, property taxes, and corporate income taxes are considered.

Presently there are three producing NPS leases in the Kuparuk River Unit. These leases were sold in Sale 39, and have 30% net profit shares. NPS payments from these leases should commence in the early 1990's.

The Endicott Unit is scheduled to begin production in October of 1987. A major lease in this unit is an NPS lease owned by Standard Alaska Production Co. This lease has a 79.6% NPS. The state is unlikely to see NPS payments from this lease before the late 1990's.

TABLE I
NPS, ROYALTY BID SALE SUMMARY

Sale No.	Date	Terms	Tracts Offered	Tracts Leased	Average $ per Acre	Bonus Received (millions $)
30	12 Dec 79	Combination of *CB Bid w/Sliding Scale Royalty and NPS Bid w/fixed Royalty & Cash Bonus	71	62	1,914.87	567.32
31	16 Sept 80	CB w/fixed Royalty & fixed NPS	78	78	63.12	12.39
32	25 Aug 81	Royalty Bid w/fixed Cash Bonus	78	59	10.00	1.52
33	13 May 81	Royalty bid w/fixed Cash Bonus	202	103	10.00	4.30
34	28 Sept 82	CB Bid w/fixed Royalty and fixed NPS	261	119	46.71	26.71
35	2 Feb 82	Royalty Bid w/fixed Cash Bonus	149	31	10.00	1.31
36	26 May 82	CB bid w/fixed Royalty and fixed NPS	13	13	573.02	32.58
37	24 Aug 82	CB bid w/fixed Royalty and fixed NPS	217	33	3.33	.563
39	17 May 83	CB bid w/fixed Royalty and fixed NPS	42	42	99.05	21.00
43/43A	22 May 84	CB bid w/fixed Royalty and fixed NPS	84	81		33.83
TOTAL			1195	510		**701.52

*CB Bid means Cash Bonus Bidding
**Totals may not agree due to rounding

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TABLE II

on that land to earn credits based upon the footage drilled and the region in which the well is situated. Since the state began offering exploration incentive credits, six EIC exploratory wells have been drilled on state lands.

Last year, no new EIC wells were drilled on state leases. The most recent EIC well drilled was Texaco's Colville Delta No. 1, completed in 1985. This well was drilled by a consortium of companies made up of Texaco, Amerada Hess, Diamond Shamrock, Placid Oil, Union Texas, Rosewood Resources, and Hunt Petroleum Company. The well encountered hydrocarbons, but further drilling is necessary to determine if the discovery has commercial potential. The state received the cost data for this well in 1986.

Currently, credits totaling approximately $31.2 million have been claimed by lessees. Cost data for all six EIC wells are summarized on the table below.

EXPLORATION INCENTIVE CREDITS
Report Month: August 1986

ADL	WELL	COMPANY	CERTIFICATION DATE	TOTAL AMOUNT
343109	G-2 Well	Exxon	10/5/83	$6,197,625.00
		Standard Alaska	12/27/83	$4,152,408.75
		BPAE	10/5/83	$2,045,216.25
344010	Leffingwell	Arco	10/2/84	$3,706,000.00
		Union	10/2/84	$3,706,000.00
344033	J-1 Well	Exxon	10/31/84	$5,119,500.00
355005	Long Island Well	Exxon	11/14/84	$1,378,076.00
		Standard Alaska	11/14/84	$1,378,076.00
345126	Totek Hills	Arco Alaska	8/02/85	$715,530.81
355037	Colville Delta #1	Texaco	07/09/86	$637,500.00
		Amerada Hess	07/09/86	$888,594.00
		Diamond Shamrock	07/09/86	$532,639.00
		Placid Oil	07/09/86	$314,679.00
		Union Texas	07/09/86	$475,631.00
		Rosewood Resources	07/09/86	$12,662.00
		Hunt Pet Co.	07/09/86	$11,213.00
GRAND TOTAL				$31,271,350.81

Source: Alaska Department of Natural Resources, Division of Oil and Gas

Modification of Drilling Restriction in the Beaufort Sea

Following a five-month review, the department modified the seasonal drilling restriction on exploratory drilling operations in the Alaska Beaufort Sea for the 1986 drilling season.

The 1986 modifications of the seasonal drilling restriction included lifting the restriction on drilling from bottom-founded drilling structures during the fall bowhead whale migration and allowing drilling from floating drilling vessels under certain conditions. When using a floating drilling vessel, drilling above a predetermined threshold depth and testing are allowed year-round. Drilling below the threshold depth, however, is prohibited once the fall bowhead migration begins and until at least half the whales have passed the drillsite. If drilling activity occurs in or near the path of the migrating whales, a research program must be conducted to determine if the drilling activity has an adverse effect on the whales or on subsistence whaling activity.

The modified seasonal restriction allowed both Shell Western E&P and Amoco Production Company to obtain permits to use drilling ships in the Alaska Beaufort Sea for the first time during the summer of 1986. Before drilling commenced, however, the North Slope Borough filed litigation questioning the validity of the state's consistency determinations and the federal government's exploration permits for these operators. Ultimately, an out-of-court settlement was reached which

TABLE III

CURRENT STATE OIL & GAS LEASE INVENTORY
(December 31, 1986)

CATEGORY	NO. OF LEASES	NO. OF ACRES
ACTIVE LEASES	1202	4,038,656
OFFSHORE		1,748,297
ONSHORE		2,290,359
NET PROFIT SHARE LEASES	161	708,884
OFFSHORE		333,723
ONSHORE		375,161
SEGREGATED LEASES	97	
UNITIZED LEASES	442	1,034,911
OFFSHORE		276,606
ONSHORE		758,305
ROYALTY LEASES	190	505,957
OFFSHORE		154,945
ONSHORE		351,012
MINIMUM ROYALTY LEASES	71	146,996
OFFSHORE		62,636
ONSHORE		84,360
COMPETITIVE LEASES	1187	4,010,176
OFFSHORE		1,748,297
ONSHORE		2,261,879
NONCOMPETITIVE LEASES	35	28,480
OFFSHORE		-0-
ONSHORE		28,480
CONDITIONAL LEASES	86	178,051
OFFSHORE		13,396
ONSHORE		164,655

*FIVE YEAR OIL & GAS LEASE PROGRAM - 1987

INITIAL AGENCY RESPONSES FOR ONGOING REVIEW OF OIL AND GAS LEASING STIPULATIONS AND MITIGATING MEASURES

(Compiled October 6, 1987)

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

MEMORANDUM

P.O. Box 0

State of Alaska

Juneau, Alaska 99811

TO: Elizabeth Benson
Division of Governmental
Coordination - Fairbanks
Office of Management and Budget

DATE: August 7, 1987

FILE NO:

TELEPHONE NO: 465-2653

FROM: Doug Redburn, Chief
Water Quality Management
Division of Environmental Quality

SUBJECT: AOGA Stipulation
Study Agency Response

By: Michael E. Wheeler, Coordinator M.W.
Oil and Gas Development Program

In accordance with the agency assignments for addressing the AOGA Oil and Gas Lease Sale Stipulation Study, the Department of Environmental Conservation has prepared comments on the three mitigating measures which fall under the regulatory purview and statutory authority of this department. These comments (Attachment 1) are presented in the format specified in your June 19, 1987 memorandum. If you have any questions on this material, please contact Michael E. Wheeler (563-6529) at our Anchorage office.

MEW:by

cc w/attach:
Larry Dietrick, NRO
Al Ott, DFG, Fairbanks
Jerry Brossia, DNR, Fairbanks
Kurt Fredriksson, DGC, Juneau
Bill Van Dyke, DNR, Anchorage
Lance Trasky, DFG, Anchorage

Attachment 1. DEC-Assigned Stipulations Response

1. Stipulation 2. Prohibition on the dumping of drilling muds and cuttings.

   a. Type of Stipulation: Actually a term of sale, the prohibition of offshore disposal of drilling muds and cuttings applies only under certain conditions. These include: restrictions in shallow water areas of low mixing energy (e.g. within the 2 m isobath); restrictions in areas of high biological sensitivity (e.g. river mouths, clam beds); and when the discharged drilling muds and cuttings are oil based or oil-contaminated as defined by an elutriate oil and grease concentration greater than 50 mg/l.

   b. Purpose of Term of Sale: This term is designed to ensure compliance with the regulations of the Department of Environmental Conservation. Specifically, the discharge of drilling muds and cuttings is regulated by water quality criteria (18 AAC70. 020), which would preclude the offshore discharge of oil-contaminated wastes into State waters when such discharges will "cause a film, sheen or discoloration on the surface or floor of the water body." The discharge of non-contaminated muds and cuttings in the offshore marine environment in State waters is generally acceptable where it is demonstrated that such discharges will not likely cause deleterious effects to aquatic life or result in the accumulation of solids along the shoreline or in the nearshore environment (18 AAC 70. 020).

      The term of sale dealing with drilling muds disposal is designed to meet regulatory requirements and clearly state how those requirements would be applied. In this sense, the term of sale provides advance notice to industry of operating conditions that may be expected for potential lease sale tracts. Furthermore, the term is not discretionary, and equivalent conditions are specified within NPDES discharge permits.

   c. Effectiveness: The effectiveness of this term as an additional tool is that it provides prospective bidders information on what permit restrictions and operating conditions would apply to specific tracts within a proposed sale area. This advanced notice is to industry's benefit in planning operations costs and figuring such costs into the bidding process.

      Its effectiveness in protecting water quality has been demonstrated through field monitoring of marine disposal areas for heavy metals and petroleum hydrocarbons, and monitoring hydrocarbon tissue burdens in key species. Study results have indicated only localized degradation of water quality and sediment quality, and no reported accumulation of hydrocarbons in marine species.

2. Stipulation 6. Discharge of Produced Water.

   a. Type of Stipulation: This condition is also a term of sale to be applied to ensure compliance with DNR plan of operation approvals. Like the drilling wastes term, this term is area- and depth-specific and is applied to ensure compliance with state water quality standards. Typically, in seasonally ice-covered nearshore areas of the arctic (Beaufort Sea, Chukchi Sea and Norton Sound), discharge of produced waters is prohibited only within the 10 m isobath (depth contour). This prohibition is uniformly applied in both state and federal lease requirements applicable to these areas. No prohibition applies outside the 10 meter depth contour. It has been demonstrated in several national studies that mixing and dilution is insufficient seasonally or annually in such shallow areas to mitigate the adverse environmental effects of this type of continuous discharge of wastes containing low levels of aromatic hydrocarbons, and which are high in salinity and low in oxygen or anoxic. In areas of greater depth and tidal mixing, conditions are not as stringent (e.g. Cook Inlet) since dispersion is enhanced. In onshore situations and in some offshore development projects, it is common practice to reinject produced waters into shallow formations or to commingle them with fluid streams used for water flooding.

   b. Purpose of the Term of Sale: The purpose of this term is to minimize deleterious effects, minimize violations of water quality, and provide a clear statement of the manner in which state regulatory requirements for water quality standards would be applied to this specific category of wastewater. Statutory authority rest in AS 46.03.010, AS 46.03.020, AS 46.03.070, AS 46.03.080, AS 46.03.100 and AS 46.03.110; while regulatory authority may be found in the state water quality criteria (18 AAC 70.020) dealing with the water quality parameter of petroleum hydrocarbons and the marine water use of growth and propagation of fish, shellfish, aquatic life and wildlife.

   c. Effectiveness: This term prevents the adverse impacts of low levels of water-soluble oil components which have been shown by several studies to have deleterious effects on benthic organisms chronically exposed over long periods of time. Reduced numbers of benthic individuals and species have been demonstrated a considerable distance (greater than 300 meters) from the discharge point of produced waters. This reduction of benthic individuals and species is highly correlated with increases in sediment hydrocarbon concentrations. The movement of polluted sediments out of the originally affected area represents an additional concern. The term of sale also address this concern as well by serving to to minimize the area of potential impact.

Additionally, this term provides prospective bidders information on what permit restrictions and operating conditions would apply to specifc tracts within a proposed sale area. This advanced notice is to industry's benefit in planning operations costs and figuring such costs into the bidding process.

3. Stipulation 12. State Discharge Monitoring Requirements that Exceed NPDES General Permit Regulations

   a. Type of Stipulation: The AOGA comments on this requirement refer to a permit condition which is included in general and individual NPDES permits which requires that drilling muds and cuttings discharged into State waters meet a 50 mg/l test criterion for elutsiate oil and grease contamination. Muds and cuttings which fail this test are considered oil-contaminated. The test requirement is not a state oil and gas lease stipulation and it is not a proposed term of sale for the plan of operations. Thus, review of this requirement is not within the framework of the state oil and gas leasing process.

   b. Purpose of this Requirement: This permit requirement provides the state with an objective, quantitative measure of the oil and grease concentration of used drilling muds and cuttings. This information is necessary in order to ensure compliance with water quality standards dealing with petroleum hydrocarbons, oils and grease. The statutory authorities and regulatory references are the same as cited for the previous term.

   c. Effectiveness: This monitoring requirement is currently under review in the Cook Inlet for comparison to EPA's visible sheen test. Results of a comparative study will be used to analyze effectiveness and cost considerations.

MEMORANDUM

State of Alaska

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

TO: Elizabeth Benson
DGC/OMB

DATE: September 3, 1987

FILE NO:

TELEPHONE NO: 561-2020

FROM: Bill Van Dyke Bill
Petroleum Engineer

SUBJECT: AOGA Stipulation Study

Attached are our comments for the lease stipulations which were assigned to the department for review under the AOGA stipulation study. If you have any questions concerning these comments, please contact me at 762-2550, Dave Johnston at 762-2592, or Kristina O'Connor at 762-2548 (PROFS account NROCKOC).

cc w/attach: Kurt Fredriksson - DGC
Jerry Brossia - DNR
Al Ott - DFG
Lance Trasky - DFG

0960J/p5

1. Requirement for archeological and historical surveys prior to construction and drilling operations.

a. Type of stipulation: The requirement for archeological and historical surveys prior to construction and drilling operations is a term of sale. The term requires lessees to perform an inventory of archeological and historical sites within the area of the proposed activity before the activity occurs. The inventory requires site surveys, consideration of local history (written and oral sources) and consultation with the Alaska Heritage Resources Survey and the National Register of Historic Places.

This term of sale should be viewed in association with a separate lease stipulation which addresses the discovery of historic or archeologic objects. That stipulation insures protection to any structure or object of historic or archeologic significance that is discovered during operations on the leased area. The stipulation requires the lessee to report such findings to the Department, and to make every reasonable effort to preserve and protect such site, structure, or object from damage.

b. Purpose: The purpose of the term of sale and the stipulation is to ensure compliance with the Alaska Historic Preservation Act (AS 41.35). Under the Act, the state establishes its policy to preserve and protect the historic, prehistoric and archeological resources of the state from loss, desecration and destruction so that the scientific, historic and cultural heritage embodied in those resources may pass undiminished to future generations. Further, the Act makes it unlawful to appropriate, excavate, remove, injure or destroy any historic, prehistoric or archeological resources of the state.

c. Effectiveness: The term of sale and stipulation are adopted for all state oil and gas lease sales, both onshore and offshore, to protect archeological and historical resources. Onshore, the term and stipulation provide effective protection for those resources. Generally, the level of investigation is related directly to the likelihood of discovery. Offshore, the term and stipulation appear to be ineffective and somewhat impractical because of the difficulty of conducting investigations in that environment (especially in Cook Inlet and the Beaufort Sea). For this reason, the requirement to conduct an inventory in offshore areas is usually waved at the plan of operation stage, depending on the likelihood of a possible discovery.

The department believes that requiring lessees to conduct archeological inventory is appropriate and constitutes wise land use management. The best means, and certainly the most economical way, to mitigate possible disturbance of archeological sites is to avoid the site in the first place. This can be accomplished most readily by requiring lessees to perform an archeological inventory prior to exploration and construction activities.

2. Requirement for environmental training of all personnel involved in drilling program.

a. Type of stipulation: The requirement for environmental and cultural training for drilling personnel is a term of sale. Under the term, lessees must develop an environmental training program for all personnel involved in exploration or development activities (including personnel of the lessee's contractors and subcontractors). The program must be designed to inform employees working on the project about specific types of environmental, social, and cultural concerns which relate to each employee's job. The program must be formulated and implemented by qualified instructors experienced in each pertinent field of study and must employ effective methods to ensure that personnel understand and use techniques necessary to preserve archeological, geological, and biological resources. The program must also be designed to increase the sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which such personnel will be operating.

b. Purpose: The purpose of the term is to enhance the sensitivity of oil field workers to the unique environment and social structure which exists within Alaska. Although no specific statutory authority exists to require environmental and cultural training, the department believes it is appropriate since, at least in the past, many oil field workers were new arrivals in the state. The department believes that the program reduces social tension and creates more respect and understanding for Alaska's unique environment and its indigenous people.

c. Effectiveness: The determination of the term's effectiveness is subjective. The benefits of environmental and cultural training, which is designed to enhance worker sensitivity to Alaska's environment and Native people, can not be reduced to economic terms, nor can specific examples be provided showing that environmental damage or social disruption was avoided or reduced by requiring that training. Nevertheless, the department believes that benefits (ie. reduced problems) are obtained by requiring those programs. The state's support for environmental and cultural training contributes to local community preception that the state's is committed to sound resource development. From industry's viewpoint, the environmental and cultural training of its employees enhances the public image of the corporation.

Although the state derives certain intangible benefits from environmental and cultural training programs, those programs are not essential to the absolute economic success of oil and gas development within the state. For this reason, the training requirement could be dropped. However, the department does not believe that environmental and cultural training is a costly requirement. The training programs are rather generic, and are readily adaptable for use throughout Alaska. Once produced, the company's environmental and cultural training program can be used to educate its employees prior to conducting activities on any of its current and future oil and gas leases.

3. Removal of drilling sites, roads, buildings, airstrips, or other facilities and rehabilitation of the site.

a. Type of stipulation: The requirement to remove all facilities and rehabilitate the site is a term of sale. Generally, upon abandonment of drilling sites, the lessee must remove all roads, buildings, airstrips or other facilities, and rehabilitate the area unless the department determines that such removal and rehabilitation is not in the state's best interest.

b. Purpose: No specific statutory authority exists to require facility removal and site rehabilitation. The department's authority to require facility removal and site rehabilitation falls under its broad discretionary powers (Title 38) for land use management. AS 38.05.180 provides that it is in the state's best interest to "minimize the adverse impact of exploration, development, production, and transportation activity." The lease contract includes the specific rehabilitation and abandonment language. Title 11 of the department's regulations requires that a rehabilitation and abandonment plan be submitted for approval. Although facility removal and site rehabilitation are not specifically provided for under state statute, the department believes that such a requirement is a useful mitigation tool, which reduces the environmental issues associated with oil and gas development. The state's leasing strategy calls for protection of "the integrity of affected cultures, the environment, and fish and wildlife resources through the terms of the plans of operations, lease and permit stipulations, and monitoring of lease operations.

c. Effectiveness: To date, the state has had limited experience upon which to judge the effectiveness of this term. Most North Slope and Cook Inlet fields are still active. Only a few drilling sites have been abandoned and only minor amounts of rehabilitation work has been done. Basically, facilities on those abandoned sites have been removed and the underlying gravel used for other purposes. Rehabilitation on the North Slope is still experimental; only a few very short roads and other impacted areas have been reclaimed. In the Beaufort Sea, a number of drilling islands have been abandoned. On those islands, all facilities and slope protection have been removed, and the island left to erode away.

The effectiveness of the term perhaps is best exemplified by the site rehabilitation work conducted on an oil and gas lease on the Alaska Peninsula. In 1984, the state permitted construction of a drilling site and airstrip on an Amoco lease near Becharof Lake. As a condition of that permit, the lessee was required to remove all facilities, decommission the airstrip, and rehabilitate the area upon abandonment of the site. Although no concerted effort has been made by the state to specifically document results, the restoration work appears to have been successful.

4. Documentation of Alaska hire

The department no longer requires documentation of Alaska hire. Instead, the department only encourages lessees to hire and employ local and Alaska residents and companies to the extent they are available and qualified for work performed on the leased area.

The following lists contain the standard stipulations the Division of Land and Water Management would normally attach to an industry request for a permit to construct a development drill site and an exploratory drill site (winter operation). Please note that there are often special stipulations attached to these type of permits that are "tuned" specifically for that operation and setting. These types of stipulations are usually aimed at unusual access, terrain, timing, environment, and construction.

STANDARD STIPULATIONS FOR DEVELOPMENT DRILL SITES

1. Vehicles shall be operated in a manner such that the vegetative mat of the tundra is not disturbed and blading or removal of tundra vegetative cover is prohibited except as approved by the Director of the Division of Land and Water Management or his designee. This stipulation is intended to protect the vegetative mat from being removed from the underlying substrate exposing soils to thermal degradation or hydraulic erosion. (6 AAC 80.040, 6 AAC 80.130, 6 AAC 80.140)

2. On-tundra travel shall be subject to termination within 72 hours of notification by the Director of the Division of Land and Water Management or his designee for protection of surface vegetation from being removed from the underlying substrate exposing soils to thermal degradation or hydraulic erosion. (6 AAC 80.040, 6 AAC 80.130, 6 AAC 80.140)

3. Ice roads and/or ice pads may be constructed in the work areas as long as they are thick enough to prevent damage to the tundra and underlying substrate. No other ice roads are authorized under this permit. (6 AAC 80.130, 6 AAC 80.140)

4. Tundra travel shall be limited to that area to be impacted with gravel placement. This stipulation is to protect the tundra surface outside the area of construction. (6 AAC 80.130)

5. The crossing (e.g., installation of a drainage structure, placement of an obstruction, diversion, etc.) of any fish stream (e.g., resident or anadromous fish species) requires a Title 16 (A.S. 16.05.840) permit from the Alaska Department of Fish and Game (479-0882). This stipulation is to allow for the free passage of resident or anadromous fish and to protect bank habitat, prevent soils erosion, and maintain natural drainage patterns. (AS 16.05.870, 6 AAC 80.130, 6 AAC 80.040)

6. Adequate culverting shall be installed to maintain surface drainage patterns and to prevent ponding. This stipulation is necessary to protect surface habitats and prevent erosion. (6 AAC 80.070, 6 AAC 80.130)

7. Fuel storage facilities shall not be placed within 100 feet of water bodies and must be within an impermeable diked area of 110 percent capacity of the largest independent fuel container. Manifolded tanks, day tanks, or bladders must be considered as a container. This stipulation is to protect the state's lands, waters, and habitats from potential fuel leaks and spills. (6 AAC 80.070, 6 AAC 80.130)

8. The reserve and fuel pits shall be rendered impermeable. This stipulation is intended to stop the leaching of hydrocarbons through the pit walls and into the lands and waters of the state. (6 AAC 80.070, 6 AAC 80.130)

9. All oil and hazardous material spills shall be cleaned up and reported per 18 AAC 75.080. Phone 1-800-478-9300 to report spills. This stipulation is intended to insure the proper reporting, clean-up, and handling of hazardous material spills as well as protect the tundra environment from such spill. (6 AAC 80.140, 6 AAC 80.130)

10. Relief pits and flare pits are not required to be rendered impermeable as long as they are only utilized for their designed purpose. Any other uses (e.g., mud storage, etc.) are prohibited. If emergency uses are required, they must be reported to the Northern Regional Office of the Department of Environmental Conservation and cleanup operations started within 72 hours after the emergency has come under control. This stipulation is intended to insure that all potential hazardous materials are removed from unlined pits to protect adjacent habitat and waters from possible leaching of materials into these areas. (6 AAC 80.070, 6 AAC 80.130)

11. All flow test holding facilities shall be lined and diked to 110% of the containment tanks. This stipulation is to insure containment of hydrocarbons within a specified area around the portable testing facilities in the event of a leak or break thereby protecting the state's lands, waters and habitat from potential contamination and loss. (6 AAC 80.070, 6 AAC 80.130)

12. Amendments or modifications to this permit must be approved in writing by the Director of the Division of Land and Water Management or his designee.

13. Gravel will be removed from state approved sources at which blasting may be required to complete gravel operations. Approval of this lease operation authorizes such blasting. Accounting for all utilized fill material will be pursuant to the existing material sales contract.

14. The Director of the Division of Land and Water Management shall be informed in writing of all ongoing, approved, development phases involving the placement of additional material on the tundra.

15. The Director of the Division of Land and Water Management may require that his authorized representative be on-site during any operations conducted under this permit.

16. The permittee shall inform and ensure compliance with these stipulations by its agents, employees, and contractors (including subcontractors at any level).

17. Flowline routing and placement shall be approved by the Director of the Division of Land and Water Management prior to installation.

18. As stated in Director's Policy File FY 80-20, a certified as-built survey of permanent improvements will be supplied to the Division of Technical Services within 120 days after completion of gravel placement.

STANDARD STIPULATIONS FOR EXPLORATORY DRILL SITES

1. Vehicles shall be operated in a manner such that the vegetative mat of the tundra is not disturbed and blading or removal of tundra or vegetative cover is prohibited except as approved by the Director of the Division of Land and Water Management or his designee. Filling of low spots and smoothing by the use of snow and ice is allowed. Ice or snow bridges constructed at stream crossings shall not contain extraneous material (i.e., soil, rock, brush, or vegetation) and shall be removed immediately after use or prior to break up. Where necessary, river ice slotting shall take place to facilitate water flow during break-up. This stipulation is intended to protect the vegetation mat from being removed from the underlying substrate exposing soils to thermal degradation or hydraulic erosion. (6 AAC 80.040, 6 AAC 80.130, 6 AAC 80.140)

2. On-tundra travel shall be subject to termination within 72 hours of notification by the Director of the Division of Land and Water Management or his designee for protection of surface vegetation from being removed from the underlying substrate exposing soils to thermal degradation or hydraulic erosion. (6 AAC 80.040, 6 AAC 80.130, 6 AAC 80.140)

3. Summer on-tundra travel shall require specific approval from an authorized field representative of the Division of Land and Water Management and shall be limited to vehicle types and time periods approved by this division. This stipulation is intended to protect the vegetative mat from destruction and exposure of the substrate soils and subjecting the areas to thermal degradation or hydraulic erosion. (6 AAC 80.040, 6 AAC 80.130, 6 AAC 80.080, 6 AAC 80.140)

4. The winter operation of ground contact vehicles for off-road travel must be limited to those areas which have adequate ground frost and snow cover to prevent damage to the ground surface from the destruction of the surface vegetation and subsequent exposure of substrate soils which can lead to thermal degradation or hydraulic erosion. (6 AAC 80.140, 6 AAC 80.130, 6 AAC 80.080)

5. Winter on-tundra travel may begin when adequate snow cover and frost depth conditions exist to protect the tundra vegetative mat from disturbance from the activities intended. Tundra opening is determined by an authorized field representative of the Division of Land and Water Management. With prior approval certain on-tundra activities may begin sooner than others depending on the impact or magnitude of the operations. (6 AAC 80.130, 6 AAC 80.140, 6 AAC 80.080)

6. Movement of equipment through willow (Salix) stands shall be avoided where possible. This stipulation is intended to protect the areas willow stands which are a limited habitat, valuable for browse and erosion control. (6 AAC 80.130, 6 AAC 80.140)

7. Incinerator residue shall be backhauled to a solid waste disposal site approved by the Department of Environmental Conservation. This stipulation is intended to protect state lands, habitats, and water from unauthorized solid waste disposal. (6 AAC 80.130, 6 AAC 80.140)

8. Ice or snow roads shall be thick enough to prevent damage to the tundra vegetation. This stipulation is intended to protect the vegetative mat from being removed from the underlying substrate exposing soils to thermal degradation or hydraulic erosion. (6 AAC 80.130, 6 AAC 80.140)

9. Trash, survey lath, roadway markers, and other debris that has accumulated along the ice road or cross country tundra routes shall be cleared and picked up prior to freeze-up of the following winter. This stipulation is intended to prevent accumulation of solid waste on the tundra and to prevent the loss of and contamination of habitat. (6 AAC 80.130, 6 AAC 80.140)

10. Vehicle maintenance, campsites, and/or storage and stockpiling of material on the surface ice of lakes, ponds, or rivers is prohibited. This stipulation is intended to protect the surface waters and habitat, and adjacent state lands from possible contamination through the loss of hydrocarbons or any other hazardous substance. (6 AAC 80.130, 6 AAC 80.140)

11. All drilling muds and cuttings must be disposed of in a manner approved of by the Department of Environmental Conservation. This stipulation is intended to prevent surface contamination and subsequent habitat loss and insure proper disposal of contaminated fluids. (6 AAC 80.130, 6 AAC 80.140)

12. Fuel storage facilities shall not be placed within 100 feet of water bodies and must be within an impermeable diked area of 110 percent capacity of the largest independent fuel container. Manifolded tanks, day tanks, or bladders must be considered as a container. This stipulation is to protect the state's lands, waters, and habitats from potential fuel leaks and spills. (6 AAC 80.070, 6 AAC 80.130)

13. The reserve and fuel pits shall be rendered impermeable. This stipulation is intended to stop the leaching of hydrocarbons through the pit walls and into the lands and waters of the state. (6 AAC 80.070, 6 AAC 80.130)

14. All oil and hazardous material spills shall be cleaned up and reported per 18 AAC 75.080. Phone 1-800-478-9300 to report spills. This stipulation is intended to insure the proper reporting, clean-up, and handling of hazardous material spills as well as protect the tundra environment from such spills. (6 AAC 80.140, 6 AAC 80.130)

15. All flow test holding facilities shall be lined and diked to 110% of the containment tanks. This stipulation is to insure containment of hydrocarbons within a specified area around the portable testing facilities in the event of a leak or break thereby protecting the state's lands, waters and habitat from potential contamination and loss. (6 AAC 80.070, 6 AAC 80.130)

16. The Alaskan Historic Preservation Act (A.S. 41.35.000) prohibits the appropriation, excavation, removal, injury, or destruction of any historic, prehistoric or archeological site, or camp, either active or abandoned, shall be disturbed in any manner nor shall any item be removed therefrom. Should any sites be discovered during the course of field operations, the Commissioner of the Department of Natural Resources shall be promptly notified. (6 AAC 80.150)

17. Amendments or modifications to this permit must be approved in writing by the Director of the Division of Land and Water Management or his designee.

18. Gravel will be removed from state approved sources at which blasting may be required to complete gravel operations. Approval of this lease operation authorizes such blasting. Accounting for all utilized fill material will be pursuant to the existing material sales contract.

19. The Director of the Division of Land and Water Management may require that his authorized representative be on-site during any operations conducted under this permit.

20. The permittee shall inform and ensure compliance with these stipulations by its agents, employees, and contractors (including subcontractors at any level).

21. This permit applies only to those lands under the jurisdiction of the State of Alaska.

22. Water appropriation is not authorized under this permit.

23. Gravel road construction is not authorized under this permit.

24. Approval of this permit does not relieve the permittee of the responsibility of securing other permits, state, federal or local.

MEMORANDUM

State of Alaska
DEPARTMENT OF FISH AND GAME

TO: Robert L. Grogan
Director
Division of Governmental
Coordination
Office of Management
and Budget

DATE: September 17, 198

FILE NO.:

TELEPHONE NO.: 465-4105

SUBJECT: State Oil and Gas
Stipulation Review

RECEIVED
SEP 22 1987
DIVISION OF OIL & GAS
ANCHORAGE, ALASKA

FROM: Bruce
Bruce H. Baker
Acting Director
Habitat Division
Department of Fish and Game

Following are the Department of Fish and Game's (ADF&G) responses to comments raised by the Alaska Oil and Gas Association (AOGA) in their April 3 letter regarding state oil and gas stipulations and permit requirements. With the exception of Item 4 regarding environmental training programs, we have limited our responses to the comments specifically assigned to ADF&G. As previously agreed, a summary of the ADF&G statutes and regulations referenced in our material is enclosed.

Prior to responding to individual comments, the department would like to discuss three general items relevant to the stipulation review. We request that these general comments be included in the introduction of the final report to the Cabinet.

GENERAL COMMENTS

First, it is important to note that all of the state's oil and gas lease sale terms include a feasibility and prudence clause. In both formulating and implementing lease terms, the state recognizes that it must bear in mind available technologies and cost considerations, as well as sociocultural and environmental factors. These are carefully considered when the state applies stipulations to industry activities.

Second, it should be noted that the best interest findings prepared for each lease sale describe all of the information utilized by the state in reaching a sale decision. This includes relevant scientific research and the state's rational for adopting specific mitigation measures. Because these measures are frequently based on a large body of information, the stipulation review does not attempt to reiterate everything considered in their formulation. Rather, the review focuses on the statutory and regulatory basis for the measures, and whether scientific evidence indicates that they are effective.

Third, specific mention should be made of the relationship between state oil and gas mitigation measures and the Alaska Coastal Management Program (ACMP). All state lease sales that are located within the coastal zone are carefully reviewed to ensure consistency with the ACMP. In many instances, compliance with state mitigation measures is necessary to conform with specific guidelines in ACMP district plans.

SPECIFIC COMMENTS

1. Stipulation 4: Requirement for Environmental Training of All Personnel Involved in Drilling Programs

The Department of Natural Resources (ADNR) was assigned lead responsibility for addressing this comment in conjunction with the other agencies. Our department recommends that the following information be incorporated into ADNR's response. First, environmental training programs are not necessarily required for each individual sale area, and we have not seen any evidence that industry has prepared sale-specific programs. The state's term of sale is worded such that a single program could be used for multiple sale areas, provided that it is applicable. Second, experiences with the Alyeska Oil Pipeline, Prudhoe Bay and Kuparuk oil fields, Northwest Alaskan Pipeline preconstruction activities, and exploration in the Arctic National Wildlife Refuge clearly demonstrate that environmental training of personnel is one of the most effective ways to ensure compliance with permit terms and conditions. Third, the value of environmental training programs is also recognized by federal leasing agencies (i.e., the Minerals Management Service and Bureau of Land Management), as evidenced by a similar training stipulation in federal lease sale documents.

2. Stipulation 7: Pipelines Constructed to Allow Safe Passage of Caribou

a. Type of Stipulation: In sale areas that encompass caribou habitat, the state requires that pipelines be designed, sited, and constructed to allow free passage of caribou. Common techniques include adequate elevation, ramping, burial of pipelines, and separation of pipelines and roads to dilute visual and audio stimuli.

b. Purpose of Stipulation: Linear developments, particularly road and pipeline complexes, can disrupt caribou movements and distribution patterns (e.g., Cameron and Whitten 1980, Curatolo and Murphy 1983). Pursuant to AS 16.05.020, it is necessary to minimize disruption of big game movements among seasonally important habitats.

c. Effectiveness: This stipulation has been moderately effective in maintaining caribou access to important habitats. A good example is the Kuparuk oilfield, where this stipulation was applied, in comparison with the Prudhoe Bay oilfield, where the stipulation was not applied until after most of the infrastructure was in place. Although there has been minor to moderate disruption of caribou movement through the Kuparuk oilfield, caribou movement through the Prudhoe Bay oilfield have all but ceased since development began there in the early 1970s. The combination of heavy traffic, high density of facilities, and batteries of aboveground feeder lines with inadequate ground clearance have all contributed to the reduction of caribou movement through the Prudhoe Bay oilfield. Although traffic remains a problem that has not been sufficiently addressed in the Kuparuk oilfield, measures for providing caribou passage have been incorporated into flowline design there. Without a caribou passage stipulation in place, there would have been no incentive for industry to research, design, and evaluate the effectiveness of various passage techniques.

3. Stipulation 8: Additional Biological Surveys Required at the Discretion of the Permitting Agency

a. Type of Stipulation: The state rarely implements lease stipulations that require lessees to conduct biological research. State unit agreement and permit approvals may occasionally include survey provisions. More frequently, federally permitted projects (e.g., Endicott), for which the state serves in an advisory capacity, contain survey requirements.

b. Purpose of Stipulation: Because there is a relative paucity of data about fish and wildlife resources and habitat use, and the effects of development activities on such resources, many of the decisions made by resource agencies are of necessity based on scientific professional judgment rather than strictly on statistical analysis. In those instances in which virtually no information is available or industry does not agree with the professional judgment of agency biologists, further studies may be required to fill data gaps and to resolve disagreements. The responsibility for conducting studies is often placed on the company requesting the permit or other action, because it is their project that will potentially impact biological resources.

Various authorities are involved when permitting agencies such as ADNR or the U.S. Army Corps of Engineers (COE) require biological surveys (e.g., 11 AAC 83.343 and 33 U.S.C. 1344; 86 Stat. 884).

c. Effectiveness: Effective mitigation of potential impacts to fish and wildlife requires several general types of information: (1) the species present and their use of habitat in the proposed project area; (2) the anticipated impacts of the proposed project on the species and their habitat use; and (3) the measures that should be taken to avoid or minimize these impacts. The first type of information is equivalent to baseline studies that, under ideal conditions, should be conducted prior to the project so that the impacts of the project can be evaluated by comparing species and habitat use with the project in place. Unfortunately, this type of information is limited for most areas of Alaska. Because oil and gas development proceeds at an accelerated pace relative to the timeframe for gathering baseline information, many such studies are conducted concurrently with development. Therefore, extrapolation of the post-development condition to pre-development condition is required, rather than a direct comparison. This extrapolation requires scientific judgments which are then subject to disagreement between the agencies and industry. An example of this is the Endicott monitoring study required by the COE to document potential changes in fish use of the nearshore marine environment as a result of the Endicott causeway.

The effectiveness of this stipulation is variable. When the agencies are significantly involved in determining the scope and evaluating the design of the studies to ensure that they actually answer the questions posed by the agencies, the effectiveness of this stipulation is usually good. For example, Northwest Alaska Pipeline Company's study of recommendations to minimize human/carnivore interactions along the gas pipeline was a successful study involving agency participation. However, when the agencies are not involved in such a manner, or when the agencies do not agree among themselves on the scope and design, the effectiveness of this stipulation is poor.

In some cases the effectiveness of this stipulation cannot be immediately evaluated. Often, the results of studies may not directly benefit the project for which the study was required, but may benefit similar projects in the future. In this case, it is tempting to view the overall stipulation as ineffective in providing answers for questions about impacts and mitigation, when in fact the lessons learned may provide more effective mitigation in future projects. Because there are so many data gaps about impacts of oil and gas development on Alaska fish and wildlife, most of our information base is expanding as we are developing oil and gas infrastructure, and lessons learned in earlier studies must be applied as additional development occurs.

4. Stipulation 11: Prohibition of Use of Stream Water in Winter Operations

a. Type of Stipulation: The state routinely imposes a stipulation on North Slope leases that prohibits winter water removal from fish-bearing waterbodies unless approved by ADNR or ADF&G, depending on which agency has jurisdiction.

b. Purpose of Stipulation: Overwintering habitat is thought to be one of the main limiting factors on North Slope anadromous and freshwater fish populations. Consequently, this stipulation has been applied to prevent drawdown of water in fish overwintering areas. For activities in streams under ADF&G jurisdiction, this stipulation is necessary to ensure compliance with AS 16.05.020, AS 16.05.840 and AS 16.05.870

c. Effectiveness: This stipulation is very effective in minimizing the loss of overwintering habitat. Prior to implementation of this stipulation on the North Slope, winter water withdrawals during oil and gas operations resulted in documented fish mortality. Since this stipulation was implemented, alternatives to winter water withdrawal from fish-bearing streams have been used. Examples include flooded gravel pits and natural lakes that do not support overwintering fish. Use of these alternatives has eliminated fish mortality resulting from dewatering of overwintering habitat.

5. Stipulation 14: Trade-offs Required to Compensate for Habitat Disturbance from Gravel Removal

a. Type of Stipulation: There are several measures routinely applied to state leases which restrict gravel removal from active floodplains. In essence, these measures encourage the use of existing material sites, abandoned gravel structures, and upland sites.

b. Purpose of Stipulation: These measures are necessary to minimize potential impacts of gravel extraction on fish resources and to ensure compliance with AS 16.05.020, AS 16.05.840, and AS 16.05.870.

c. Effectiveness: These measures have proven effective in accomplishing the above objectives. In the 1970s, shallow gravel scraping operations in the Sagavanirktok River caused channel diversions, impoundments, and fish entrapment. In some instances, these impacts coupled with those of water removal, resulted in the dewatering of fish overwintering areas. In an attempt to minimize problems arising from in-stream gravel mining and inadequate natural water supplies, the state began encouraging the use of gravel pits. After these sources have been exhausted, the pits can then be used as water reservoirs.

There are now approximately 17 gravel pits in the Prudhoe Bay and Kuparuk oilfields. These pits range in size up to 100 acres, such as the Duck Island site used to build the Endicott causeway. Use of these pits has unquestionably reduced impacts to North Slope rivers and fish resources through simple avoidance of floodplain gravel mining (refer to Item 5, Habitat Area Avoidance). However, because of the increasing number and size of gravel pits, the state has recently begun evaluating apprcpriate restoration approaches. Current thinking is that these pits could potentially provide waterfowl and fish habitat by leaving some shallow water areas and islands in the pits when gravel is extracted and, once exhausted, connecting them to natural fish-bearing streams.

To date, approximately half of the North Slope gravel pits have been filled with water. Fish sampling at these sites has confirmed that gravel pits can provide fish habitat. Although these pits were not designed to promote fish use; a total of six species of fish have been caught at these sites, with the greatest diversity (i.e., four species) found at Sag. Site C. Thus far, only one of the North Slope gravel pits has included design features specific to creating waterfowl habitat. This effort was just initiated and insufficient time has elapsed to evaluate its effectiveness.

It should also be noted that the state's gravel removal restrictions do not absolutely prohibit mining in active floodplains. River sources could potentially be used in conformance with the previously referenced statutes, provided that appropriate design and restoration features are incorporated into floodplain mining plans.

6. Sale 45A (North Slope), Stipulation 5: Habitat Area Avoidance

a. Type of Stipulation: There are nine Sale 45A measures that conditionally require habitat area avoidance: (1) a general provision requiring avoidance of sensitive fish and wildlife habitats; (2) permanent facility setbacks from fish-bearing waterbodies; (3) restrictions on development in particularly productive wetland habitats; (4) restrictions on gravel mining in active floodplains; (5) measures governing aircraft operations over high density waterfowl and caribou use areas; (6) limitations on certain activities in preferred polar bear denning habitat; (7) restrictions in the immediate vicinity of arctic peregrine falcon nest sites; (8) a facility prohibition within critical tundra swan staging habitat; and (9) possible restrictions in high density caribou calving grounds.

b. Purpose of Stipulation: All of these measures are necessary to minimize potential impacts on fish and wildlife resources, and to comply with AS 16.05.020. This statutory mandate applies to all "fish, game and aquatic plant resources," not just endangered species. Mitigation measures designed to minimize potential development-related impacts to peregrine falcons are necessary to ensure compliance with AS 16.20.185 and the federal Endangered Species Act of 1973. Measures applicable to polar bears are necessary to ensure compliance with the Marine Mammal Protection Act of 1972.

c. Effectiveness: Numerous studies have documented that low-level aircraft overflights can adversely affect wildlife. Examples of impacts include: inducement of escape behavior in waterfowl (e.g., Barry and Spencer 1976; Owens 1977; Derksen at al. 1979); loss of eggs due to predation (Barry and Spencer 1976); reduced waterfowl nesting success and production of young (USDI 1976); and inducement of escape response in caribou (Calef et al. 1976, Davis and Valkenburg 1979). Considering this, and the routine use of aircraft to support oil and gas activities, restrictions on low level overflights above high density waterfowl and caribou use areas are both justifiable and prudent.

The restriction on activities in the immediate vicinity of arctic peregrine falcon nests used by the state are the same measures recommended by the National Peregrine Falcon Recovery team. These setbacks and timing restrictions are judged to be effective in minimizing impacts to nesting peregrines. Similarly, lease terms limiting some activities in preferred polar bear denning habitat, swan nesting areas, and active flood plains have been developed by the acknowledged Alaskan authorities on those species and habitats. These terms have been carefully crafted and balanced to allow for the widest range of lease related activities, while still minimizing detrimental effects to important wildlife resources.

7. Sale 49 (Cook Inlet), Stipulations 1 and 2: Wetlands Designation/ Restrictions and Critical Habitat Areas/Waterfowl Corridors

a. Type of Stipulation: Both of these comments apparently refer to Sale 49 Terms 32 and 38, rather than Term 33 as indicated in AOGA's letter. These terms primarily address mitigation measures applied to leases located in legislatively designated state game refuges (SGR) and critical habitat areas (CHA). Consequently, it is appropriate to respond to both items collectively.

Term 32, in part, includes a prohibition on surface entry in the Clam Gulch CHA and on tidelands and wetlands in the Kalgin Island CHA and Goose Bay SGR. Exploration, development, and major maintenance activities in primary waterfowl areas within the Susitna Flats and Trading Bay SGRs are also restricted to the period between November 1 and March 31 (i.e., winter operations). Term 38 includes a prohibition on surface entry in high density tule goose and trumpeter swan nesting and molting areas in the Trading Bay SGR and Redoubt Bay vicinity. It also includes the above noted November 1 through March 31 restriction for adjacent habitats important to these species.

b. Purpose of Stipulation: These measures are necessary to ensure compliance with AS 16.05.020, AS 16.20.036, AS 16.20.038, and AS 16.20.220-270, and are consistent with 5AAC95. As discussed in the enclosure, legislation creating the vast majority of Cook Inlet SGRs and CHAs specifically mandates that land use activities in these areas must be compatible with protection of fish and wildlife populations and habitats. Activities within the Susitna Flats and Trading Bay SGRs must also be compatible with public use of these resources. The mitigation measures imposed in these areas are necessary to ensure compatibility.

c. Effectiveness: With respect to the surface entry prohibitions, the biological benefits derived from avoiding habitat alteration have been previously noted in the response to AOGA's comments on Sale 45A, Stipulation 5. The state implements this prohibition on the least amount of acreage required to ensure compliance with legislative mandates. Consequently, the state has been able to offer these areas with the covenant that any underlying hydrocarbon resources be extracted through directional drilling.

The necessity for a seasonal restriction in other important waterfowl areas is supported by scientific studies documenting that oil and gas activities can adversely affect waterfowl. Examples of documented impacts resulting from low level aircraft overflights are provided in the response to AOGA's general comments, Stipulation 14. Activities such as drilling and the operation of gas compressors have also been shown to cause waterfowl avoidance of these activities (e.g., USDI 1976, Gollop and Davis 1974). In two studies, waterfowl avoided drill rigs within a radius of 1.5 and 2.75 miles (Barry and Spencer 1976, Gollop and Davis 1974).

That concludes the department's contribution to the state oil and gas stipulation review. If your staff has any questions or requires further information, please have them contact Claudia Slater in our Anchorage office (267-2346).

Enclosure

cc w/Enclosure:
Kurt Fredricksson, DGC, Juneau
Elizabeth Benson, DGC, Fairbanks
Alvin Ott, ADF&G, Fairbanks
Lance Trasky, ADF&G, Anchorage
Larry Dietrick, ADEC, Fairbanks
Michael Wheeler, ADEC, Anchorage
Jerry Brossia, ADNR, Fairbanks
Bill Van Dyke, ADNR, Anchorage

ENCLOSURE

ADF&G STATUTES AND REGULATIONS RELEVANT TO STATE OIL AND GAS MITIGATION MEASURES

AS 16.05.020: This statute describes the functions of the Commissioner of ADF&G. Among other responsibilities, the Commissioner is to manage, protect, maintain, improve, and extend the fish, game, and aquatic plant resources of the state in the interest of the economy and general well-being of the state.

AS 16.05.840: The purpose of this statute is to ensure fish passage in all fish-bearing streams. If the Commissioner of ADF&G considers it necessary, dams and other obstructions across fish streams must include a fishway and/or device which allows for efficient passage of downstream migrating fish.

AS 16.05.870: This statute gives the Commissioner of ADF&G jurisdiction over activities affecting waterbodies specified as important for the spawning, rearing, or migration of anadromous fish. The Commissioner is authorized to regulate hydraulic projects and any other activities that use, divert, obstruct, pollute, or change the natural flow or bed of a specified waterbody or to use wheeled, tracted, or excavating equipment or log-dragging equipment in the bed of a specified waterbody.

AS 16.20.030(c): This statute established the Goose Bay State Game Refuge (SGR) in conformance with AS 16.20.020, which states that the purpose of the refuge is to protect and preserve the area's natural habitat and game populations.

AS 16.20.036: The Susitna Flats State Game Refuge (SGR) was established through this statute. The two primary purposes of the refuge are to protect: 1) fish and wildlife habitats and populations; and 2) public uses of fish and wildlife and their habitat. Among other species, waterfowl are specifically mentioned. This statute further states that entry onto the refuge for purposes of oil and gas exploration and development shall be permitted when compatible with the primary purposes of the refuge.

AS 16.20.038: This statute established the Trading Bay SGR, which was created for the same purposes, and is subject to the same compatibility requirements, as noted above for the Susitna Flats SGR.

AS 16.20.185: The purpose of this statute is to protect the habitat of endangered species. On lands under their respective jurisdictions, the Commissioners' of ADF&G and

ADNR must take measures to preserve the natural habitat of species or subspecies of fish and wildlife threatened with extinction.

AS 16.20.220-270: Eleven Critical Habitat Areas were established under these statutes. The purpose of these statutes is to protect and preserve habitat areas especially crucial to the perpetuation of fish and wildlife, and to restrict all other uses not compatible with the primary purpose.

5AAC 92.800: This administrative code identifies fish and wildlife species on the state endangered species list. There are currently five species of birds and three species of whales designated by the state as endangered.

5AAC 95: This administrative code, in part, gives the Commissioner of ADF&G authority to include conditions on Special Area permits to ensure compliance with AS 16.20.030(c), AS 16.20.036, AS 16.20.038, and AS 16.20.220-270. Permit conditions may include, but are not limited to, restrictions on the duration of a proposed activity, seasonal restrictions, limitations on the areal extent of an activity, specific mitigation measures, and reporting and monitoring requirements. Additionally, this code states that each permittee shall mitigate any anticipated or actual adverse effects upon fish, wildlife, or their habitat which result from the permittee's activities.

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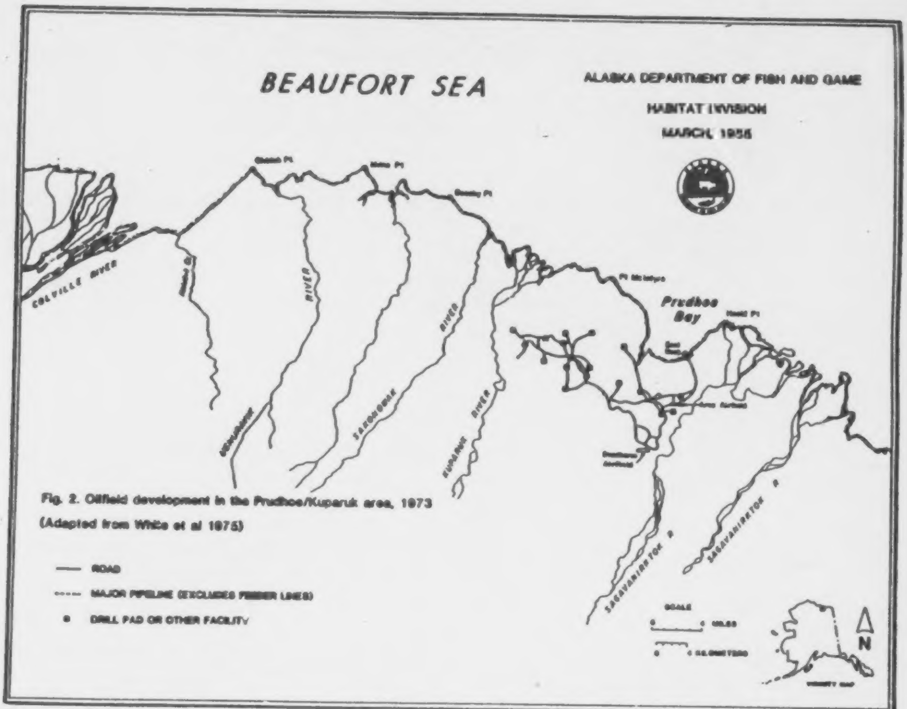
Enclosure I


BEAUFORT SEA
ALASKA DEPARTMENT OF FISH AND GAME
HABITAT DIVISION
MARCH, 1985
COLVILLE RIVER
RIVER
SAGAVANIRKTOK
RIVER
KUPARUK RIVER
Prudhoe Bay
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SCALE
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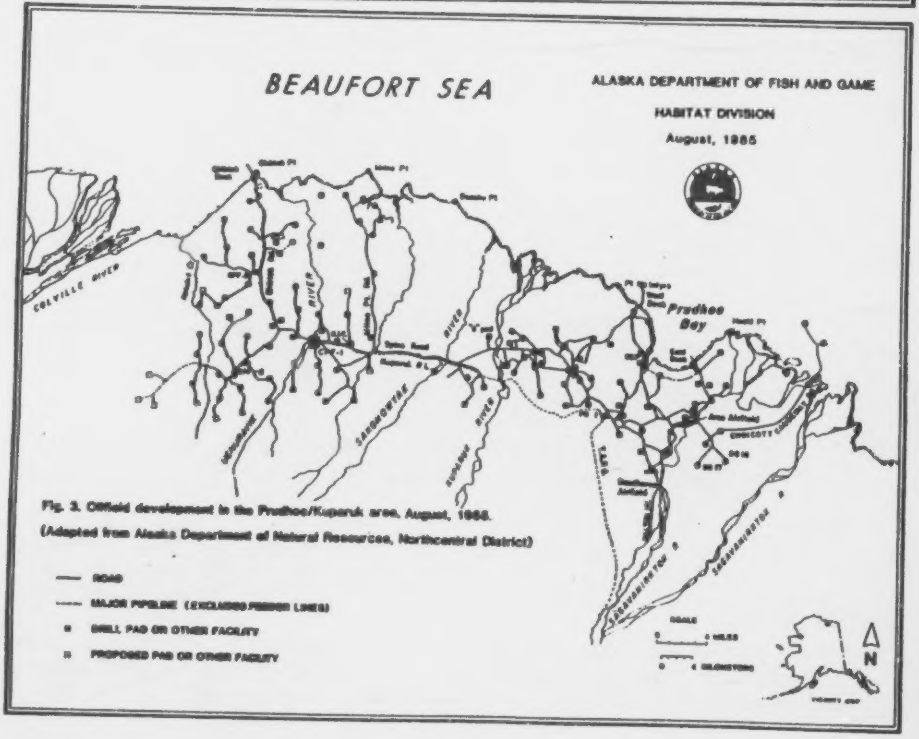
— ROAD
---- MAJOR PIPELINE (EXCLUDES FEEDER LINES)
● DRILL PAD OR OTHER FACILITY

Fig. 2. Oilfield development in the Prudhoe/Kuparuk area, 1973
(Adapted from White et al 1975)


BEAUFORT SEA
ALASKA DEPARTMENT OF FISH AND GAME
HABITAT DIVISION
August, 1985
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— ROAD
---- MAJOR PIPELINE (EXCLUDES FEEDER LINES)
● DRILL PAD OR OTHER FACILITY
□ PROPOSED PAD OR OTHER FACILITY

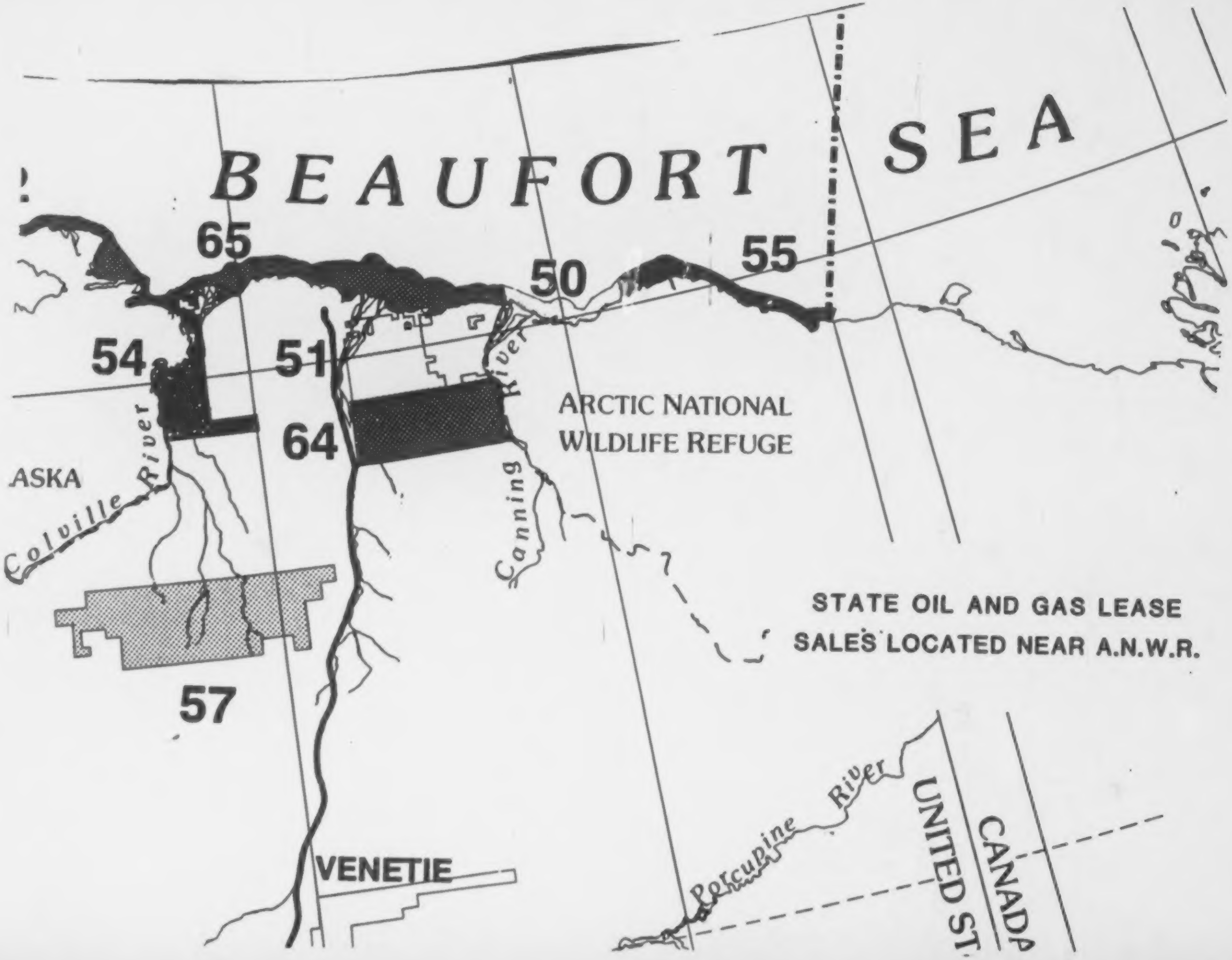
Fig. 3. Oilfield development in the Prudhoe/Kuparuk area, August, 1985.
(Adapted from Alaska Department of Natural Resources, Northcentral District)

INFORMATION PACKET FOR STATE OF ALASKA OIL AND GAS LEASE SALES 50, 51 AND 54

This packet contains information about State of Alaska oil and gas lease sales 50 and 51 and proposed lease sale 54. Sales 50 and 51 share a common boundary with the Arctic National Wildlife Refuge (ANWR). Sales 50 lies immediately offshore of ANWR in Camden Bay. It was held in June 1987. Sale 51 lies west of ANWR in an area known as the Prudhoe Bay Uplands. It was held in January 1987.

Sale 54 is a proposed lease sale scheduled for January 1988. The proposed Sale 54 area lies adjacent to the National Petroleum Reserve Alaska (NPRA).

The packet of information includes the Notice of Sale for sales 50 and 51 and the Notice of Final Finding for proposed sale 54. Each notice of sale contains sale-specific information provided to bidders, including the bidding methods, lease term, and mitigation measures. The Sale 54 notice advises potential bidders of the state's intention to make a final finding and decision regarding the sale. Attached to the Notice of Final Finding is a list of proposed mitigation measures for the Sale 54 area. Each notice includes a map of the respective sale area.


STATE OIL AND GAS LEASE SALES LOCATED NEAR A.N.W.R.

BEAUFORT SEA
65
54
51
64
50
55
57
ARCTIC NATIONAL WILDLIFE REFUGE
ASKA
Colville River
Canning River
Porcupine River
VENETIE
UNITED ST
CANADA

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

STEVE COWPER, GOVERNOR

P.O. BOX 7034
ANCHORAGE, ALASKA 99510-7034

April 30, 1987

Phone: 762-4277

NOTICE
OF
SALE

STATE OF ALASKA
COMPETITIVE OIL AND GAS LEASE SALE 50 (CAMDEN BAY)

The Department of Natural Resources, Division of Oil and Gas (DO&G), gives formal notice under AS. 38.05.945(a)(4) of its intention to offer lands for competitive oil and gas lease. Sale 50 includes 35 tracts with a total area of approximately 118,147 acres. The sale area consists of state owned offshore acreage located in the Beaufort Sea, lying between Flaxman Island and the Hulahula River. The Arctic National Wildlife Refuge (ANWR) lies immediately south of the Sale 50 area. The entire sale area is within the North Slope Borough. The North Slope communities of Deadhorse/Prudhoe Bay, Nuiqsut, Barrow, and Kaktovik may be affected by the sale.

The location of Alaska's Territorial Sea Boundary and the seaward boundary of ANWR are the subjects of a dispute between the United States of America and the State of Alaska. This dispute is pending before the U.S. Supreme Court. At issue is the ownership of a significant amount of tide and submerged land along these borders. The seaward and landward boundaries of the Sale 50 area have been established through negotiation with the U.S. Minerals Management Service and the U.S. Fish and Wildlife Service to ensure that no lands encompassed by this dispute were included in Sale 50. These boundaries are intended only to delineate the limits of Sale 50, and do not represent the official position of either the State of Alaska or the United States of America regarding the final location of the borders of ANWR or the Alaska Territorial Sea.

Bidding Method
The bidding method for all tracts will be cash bonus bidding with a minimum bid of $5.00 per acre. All tracts will have a fixed royalty rate of 16-2/3 percent.

Length of Lease
All leases issued as a result of Sale 50 will have an initial primary term of 10 years.

Lease Form
All leases issued as a result of Sale 50 will be executed on Form DNR-10-4037 (COMPETITIVE OIL AND GAS LEASE) which was revised in November 1986.

Rental
Annual rental will be $1.00 per acre for the first year, $1.50 per acre for the second year, $2.00 per acre for the third year, $2.50 per acre for the fourth year, and $3.00 per acre for the fifth and following years.

Bids also will be accepted from 9:00 a.m. to 4:00 p.m. on June 29, 1987 in Room 1380 (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska. Bids that are sent by mail must be sent to: Director, DO&G, P.O. Box 107034, Anchorage, Alaska 99510-7034, and must be received by 4:00 p.m., June 29, 1987. Bids that are sent by Federal Express, DHL, or any other delivery service must be received by 4:00 p.m., June 29, 1987, and should be addressed to: Director, DO&G, Room 1380, Frontier Building, 3601 "C" Street, Anchorage, Alaska. The envelope for each bid should be marked "State of Alaska Competitive Oil And Gas Lease Sale 50; not to be opened until 9:00 a.m., June 30, 1987; Tract #_________."

In order to bid at the sale, bidders must pre-qualify no later than 4:30 p.m., June 29, 1987. Potential bidders should consult DO&G for pre-qualification requirements and procedures.

Under 11 AAC 82.445, a bid will not be considered unless supported by the bid deposit and the information required, unless any omission is determined by the Commissioner or her designee to be immaterial or due to excusable inadvertence, and the omission is corrected within one week after receipt of a notice of deficiency.

Additional Information

In support of this lease sale, the Director of the Division of Oil and Gas has prepared a written final finding and decision under AS 38.05 035(e) which sets forth the facts and applicable laws upon which he has determined that the proposed action will best serve the interests of the state. The Director's written finding and decision are available at the Division of Oil and Gas, Frontier Building, 3601 "C" Street, Room 1398, in Anchorage or by writing DO&G at P.O. Box 107034, Anchorage, Alaska 99510-7034. Tract maps, Final Legal Descriptions and additional information on the sale are available upon request to bidders and the public at DO&G during regular office hours. The cost for each set of tract maps is $50.00. Please make checks for these items payable to: Department of Revenue, State of Alaska.

Acreage Deletions

The seaward boundary of Sale 50 has been adjusted since the Preliminary Notice was issued on November 20, 1986. This adjustment has resulted in the deletion of one tract and portions of other tracts which collectively removes a total of 4630 acres of submerged lands from the sale area. Tracts within the sale have been reconfigured and renumbered to reflect these changes.

The state reserves the right to delete tracts, and to revise tract acreage at any time up to and including the day of the sale.

James E. Eason

James E. Eason
Director

0795b

2. Corporations - Corporations must have the following documents on file at DO&G prior to 4:30 p.m., June 29, 1987:

   a. Copy of 1987 Certificate of Good Standing.

   b. The current address and phone number of the corporation.

   c. A list of current officers of the corporation that are authorized to sign a bid on behalf of the corporation.

   d. An original or certified copy of a notarized power-of-attorney authorizing any agent who is not a current officer but who has been designated by the corporation to sign a bid on behalf of the corporation.

   A Certificate of Good Standing can be obtained by sending 60 cents to State of Alaska, Department of Commerce and Economic Development, Corporation Section, P.O. Box D, Juneau, Alaska 99811, and requesting the certificate. The Certificate of Good Standing provides written proof that the corporation has paid all taxes, complied with all applicable laws, and is thus qualified to do business in the state. If information previously filed by corporations that have previously qualified to do business in Alaska is still current, this information may be incorporated together with a statement as to any material changes or amendments, since formerly qualifying.

3. Corporations That Have Not Previously Qualified To Do Business in Alaska - A corporation that has not previously qualified to do business in Alaska must submit the following documents to DO&G:

   a. If the corporation is a foreign corporation, it must submit a copy of its Certificate of Authority. If the corporation is a domestic corporation, it must submit a copy of its Certificate of Incorporation. A foreign corporation is one that has been incorporated outside the State of Alaska. A domestic corporation is one that has been incorporated within the State of Alaska.

   b. The current address and phone number of the corporation.

   c. A list of current officers of the corporation that are authorized to sign a bid on behalf of the corporation.

   d. An original or certified copy of a notarized power-of-attorney authorizing any agent who is not a current officer but who has been designated by the corporation to sign a bid on behalf of the corporation.

4. 10:30 a.m. - public reading of the bids will begin in Room 1 of Summit Hall.

D. Form for Submission of Bids

1. A separate bid must be submitted for each tract.
2. Each bid must be submitted separately in a single envelope. The envelope should be marked "State of Alaska Competitive Oil and Gas Lease Sale 50; not to be opened until 9:00 a.m., June 30, 1987; Tract # ______." No other statements, information, or identification should appear on the outside of the envelope.

   The following items must be contained in each envelope:

   a. An executed bid form DO&G 1-87 or an exact copy of that form. The bidder or the agent authorized to receive notices on behalf of all bidders should state his or her name, company (if applicable), address, and telephone number on the bid form. All lease-interest percentages must be represented by numbers with the fractional interest carried out to no more than five decimal places. No bids with the lease-interest represented by fractions will be accepted unless the fraction can be expressed in decimals of no more than five digits without rounding off. The sum of the lease-interest ownerships covered by this bid must be exactly 100.00000 percent.

   b. Bid Deposit: Check or money order made payable to the "Department of Revenue, State of Alaska." Bid deposits must be in U.S. dollars and must be tendered in cash or by money order, cashier's check, certified check, or treasurer's check in the total amount of 20% of the total cash bonus being offered for the tract. Note: Personal checks will not be accepted. No bid for less than a full tract will be considered.

3. Under 11 AAC 82.430, joint bids must disclose, and the bid form must be signed by or on behalf of, each person who has any working interest in the bid or who will receive any working interest in any lease issued in this sale by virtue of any agreement or understanding, oral or written. This requirement does not mean that persons who are interested in a bid only as stockholders in a corporation must sign the bid and lease form, and does not mean that the designated information must be furnished as to those persons. Joint bids must state the percentage of interest of each bidder and must designate one person who is authorized to receive notices on behalf of all the bidders.

E. Method of Handling Bid Deposits and Lease Awards

1. Bid deposits will be safeguarded against theft, misappropriation and loss. Receipt of a bid deposit by the state does not constitute and shall not be construed as acceptance of any bid on behalf of the state.

6. Upon acceptance of a bid by the Commissioner of Natural Resources, the successful bidder will be notified by postal Express Mail of the lease award and will be sent two copies of the lease for signature. Within 30 days of the date that the bidder receives notification of the lease award, the bidder must: 1) sign both copies of the lease; 2) return them to the Division of Oil and Gas for execution; 3) pay the balance of the cash bonus and accrued interest; and 4) pay for the first year annual rental. Interest of 5.66% per annum (which is the market interest rate for 90-day U.S. Treasury bills averaged for the week of March 27 - April 2, 1987) will be charged on the balance of the cash bonus accruing from the date following the successful bidder's receipt of the notification of the lease award up to and including the date of payment. Interest must be paid on the cash bonus only and not on the first year of rental. Payment of the balance of the cash bonus, accrued interest and rental must be accomplished in the following manner:

    The successful bidder will wire transfer federal funds in the amount of the balance of the cash bonus and accrued interest, and annual rental for the first year to: First Pennsylvania Bank of Philadelphia, ABA #031000024, for credit to State of Alaska, Account #07/089250/00, Attn: Catherine Hess. The wire transfer should specify on whose behalf the payment is being made. If possible, bidders should use only one wire transfer. Interest calculations should be based on a 360-day year times the actual number of days that interest is owed.

    In addition, the successful bidder must by 9:00 a.m. (Alaska Daylight Savings Time) the day before the wire transfer, telex (or facsimile transmit) the following information to the State of Alaska, Department of Revenue, Treasury Division, Attention: Vern Voss at Telex No. 099-45-333, Telecopy #465-2394, and the Department of Natural Resources, Division of Oil and Gas, Telex No. 090-25-360, Telecopy #563-6411:

    1. the Alaska Division of Lands (ADL) number assigned to each tract;
    2. amount of balance of cash bonus bid being paid per tract, interest on that balance, and annual rental;
    3. name(s) of the bidder(s) on whose behalf the funds are being wire transferred;
    4. originating bank of the wire transfer; and
    5. total amount of wire transfer.

    For further information regarding payment and computation of interest, please contact Vern Voss, Cash Manager, Treasury Division, Juneau, Alaska (907) 465-2360.

b. Exploratory Drilling Operations from Floating Drilling Structures

Subject to conditions c and d below, exploratory drilling and other downhole operations above a predetermined threshold depth and testing through casing is allowed year-round from floating structures.

Exploratory drilling below the threshold is prohibited upon commencement of the fall bowhead whale migration until half of the whale population has passed the drillsite, as determined by the National Marine Fisheries Service (in consultation with the Alaska Eskimo Whaling Commission), or until October 1st, whichever occurs first.

c. Exploratory Drilling During the Fall Bowhead Whale Migration

When exploratory drilling activity is authorized and conducted at a location in the main migratory path of the bowhead whale during the whale migration, the operator must conduct a bowhead whale research program to determine the effects of noise from drilling activity and related support activities on bowhead whales and on the subsistence bowhead whale harvest. For exploratory locations between the barrier islands and the main migratory path, a decision on whether a research program is needed will be made on a case-by-case basis.

The general objectives of the research program shall be to determine if the following occurs as a result of noise and disturbance generated from drilling and support activities:

i. disruption of bowhead whales, or bowhead whale hunters, that makes the subsistence harvest more difficult;

ii. short-term displacement of bowhead whales from their migratory path, from subsistence harvest areas, or from feeding areas (Information must be collected on distribution, behavior and movement of bowhead whales in the vicinity of the drillsite and of support operations. This information will later be used to determine whether long-term displacement is occurring.); and

iii. separation of cows and calves.

To ensure that the research program will adequately address these objectives, the operator shall begin consultation with the State of Alaska by April 15. The state will coordinate with the North Slope Borough and appropriate federal agencies to assist the operator in the development and approval of a research program. Unless it is determined by the state that it is not feasible or necessary, the operator shall consult with the state before: (1) the objectives of the research proposal are finalized and sent out to the contractor for bid, (2) the contractor for the project is selected, and (3) the program is finalized. The applicant will retain the authority for final approval and selection of the contractor. The state must approve the research program after consultation is completed.

2. Lessees are advised that the North Slope Borough (NSB) Assembly has adopted a Comprehensive Plan and Land Management Regulations under Title 29 of the Alaska Statutes. The regulations require NSB approval for certain activities necessary for exploration and development of the lease. The state may not in all instances accept this assertion of jurisdiction.

3. During the conduct of all activities related to this lease, the lessee will be subject to the provisions of all valid coastal zone plans and ordinances. The Division of Oil and Gas will require, as a condition for consistency approval of lease operations, such modification or stipulations as may be necessary to ensure consistency with the Alaska Coastal Management Program, and with sound planning and management of coastal zone resources.

4. An application for water rights must be submitted to the Department of Natural Resources prior to diverting, impounding, or withdrawing water from any ground or surface source. The lessee will be responsible for ensuring that an adequate supply of water is available for winter use through development of such means as storage reservoirs and snow melting.

5. The following provisions will govern aircraft operations in and near the sale area:

   a. Aircraft must fly at altitudes of greater than 1,500 feet (457 m) or at a lateral distance of one mile around barrier islands, lagoons, river deltas, and wetlands within one mile of the Beaufort Sea coast (excluding take-offs and landings) from May 15 through September 30.

   b. From May 15 to June 20, aircraft flying within 30 miles of the coast between the Canning and Sagavanirktok Rivers must avoid Caribou and Muskoxen by an altitude of 1500 feet (457 m) or a lateral distance of one mile (excluding take-offs and landings).

   c. Human safety will take precedence over aircraft restrictions.

6. In conducting offshore geophysical surveys, neither lessees nor their agents will use explosives in open water areas. Offshore geophysical surveys will be restricted as necessary to comply with the provisions of the Marine Mammal Protection Act and with the provisions of the Endangered Species Act as they relate to the bowhead whale.

7. An Oil Discharge Contingency Plan will be required for offshore operations as specified under AS 46.04.030 and 18 AAC 75.

Facilities and Structures:

8. With the exception of approved pipelines, permanent facilities will be prohibited within 500 feet (152 m) of the Canning River. Permanent facilities will be prohibited within 100 feet (30 m) of all other fish-bearing streams unless the Director, Division of Oil and Gas, after consultation with the Department of Fish and Game, determines that such facilities placement will not significantly disturb critical wildlife habitats or that such a requirement is not feasible or prudent.

and anadromous fish. Causeways may not be located in river mouths, deltas or the kelp community northeast of Konganevik Point. Causeways may not cause a violation of the Alaska Water Quality Standards (18 AAC 70).

Local Hire:

16. The lessee is encouraged to hire and employ local and Alaska residents and companies, to the extent they are available and qualified, for work performed on the leased area.

Environmental Training:

17. The lessee must include in any exploration and/or development plans a proposed environmental training program for all personnel involved in exploration or development activities (including personnel of the lessee's contractors and subcontractors) for review and approval by the Director, Division of Oil and Gas. The program must be designed to inform each person working on the project of specific types of environmental, social, and cultural concerns which relate to the individual's job. The program must be formulated and implemented by qualified instructors experienced in each pertinent field of study and must employ effective methods to ensure that personnel understand and use techniques necessary to preserve archeological, geological, and biological resources. The program must also be designed to increase the sensitivity and understanding of personnel to community values, customs, and life styles in areas in which such personnel will be operating. The lessee must also submit for review and approval a continuing technical environmental briefing program for supervisory and managerial personnel of the lessee and its agents, contractors, and subcontractors.

Access:

18. No restriction of public access to, or use of, the leased area will be permitted as a consequence of oil and gas activities except in the immediate vicinity of drill sites, buildings and other related structures. Such areas where access is to be restricted must be identified in the plan of operations. No lease facilities or operations may be located where they would block public access to or along navigable and public waters as defined in AS 38.05.965(12) and (16). If lease facilities will be located in the vicinity of these public waters, an easement will be reserved under AS 38.05.127 and 11 AAC 53.330 to ensure the right of public access.

19. Surface use will be restricted, as necessary, to prevent unreasonable conflicts with local subsistence harvests.

Third Party Interests:

20. If only the subsurface estate is owned by the state, or if the surface is owned by the state but subject to third party interests, the lessee must not enter upon such land until the lessee makes a good faith effort to agree with the surface interest holder on settlement of damages that may be caused by lease activities. If an agreement cannot be reached, the

b. Disposal of oil-based or oil-contaminated drilling muds and cuttings in offshore waters and on sea ice is prohibited.

c. Offshore discharge of drilling muds and cuttings is prohibited within 1000 m of river mouths or deltas during unstable or broken ice or open water conditions.

d. During exploratory drilling, the disposal of drilling muds and cuttings within the two-meter isobath is prohibited during open water conditions. Drilling muds and cuttings free of hydrocarbon contamination may be discharged to open water outside of the two-meter isobath. However, the discharge must be diluted at a ratio of at least nine parts seawater to one part drilling fluid.

e. When exploratory drilling operations occur during periods of stable ice, uncontaminated drilling muds and cuttings may be disposed of on the sea ice surface in areas free of cracking or major stress fractures. Predilution is not required.

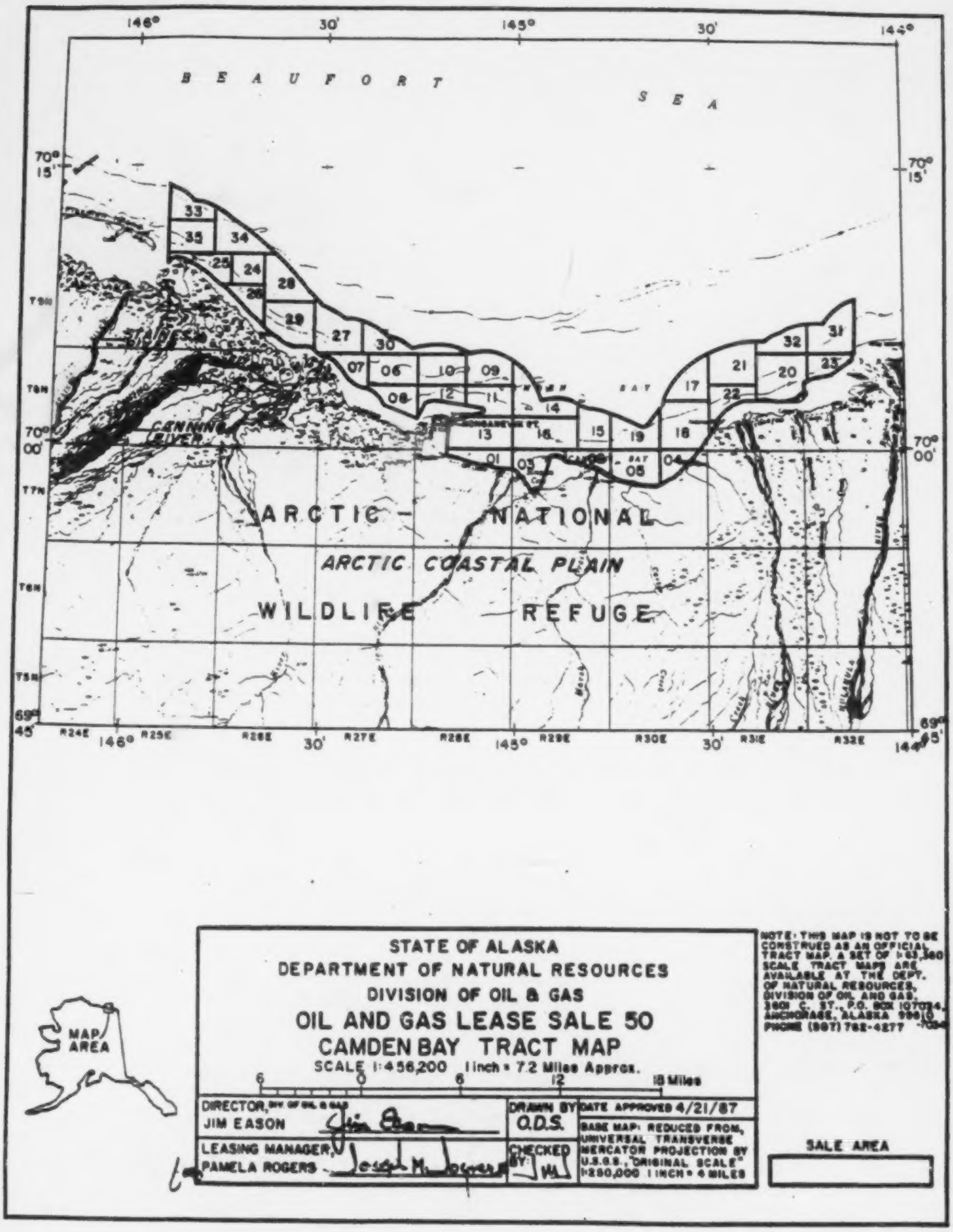
f. When exploratory drilling operations occur during periods of broken or unstable ice, uncontaminated drilling muds and cuttings may not be discharged unless it is not practicable to store them for disposal on stable sea ice or in open water; to dispose of them on land; to create an on-ice disposal site by pumping and artificial thickening of sea ice; or to handle the muds and cuttings in a manner that prevents below-ice discharge. If it is not practicable to meet these conditions, discharge is subject to approval by the Department of Environmental Conservation.

g. Offshore disposal of drilling muds and cuttings during development and production will be subject to the conditions of NPDES permits issued by the Environmental Protection Agency and those Alaska Coastal Management Program consistency requirements incorporated in or accompanying the NPDES permit. Injection of liquid wastes through well annuli or dedicated injection wells is the disposal method of choice. The lessees shall employ this method of disposal whenever it is technically feasible.

Gravel Mining:

26. In meeting gravel needs for exploration, development and production, gravel from nearby abandoned drilling sites and existing material sites must be used first unless the Director, Division of Land and Water Management, after consultation with the Director, Division of Oil and Gas, and the Department of Fish and Game, determines that the reuse of such sources is not feasible and prudent.

27. Gravel extraction from barrier islands is prohibited. Gravel extraction from lagoons and nearshore areas is prohibited unless the Director, Division of Land and Water Management, finds, in consultation with the Department of Fish and Game and the Department of Environmental Conservation, that, on the basis of scientific evidence, gravel extraction in these areas will not adversely affect the environment or that no alternative feasible and prudent source exists.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MAP AREA
SALE AREA

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL & GAS
OIL AND GAS LEASE SALE 50
CAMDEN BAY TRACT MAP
SCALE 1:456,200 1 inch = 7.2 Miles Approx.
6 0 6 12 18 Miles

DIRECTOR, DIV. OF OIL & GAS JIM EASON	DRAWN BY O.D.S.	DATE APPROVED 4/21/87
LEASING MANAGER, PAMELA ROGERS	CHECKED BY:	BASE MAP: REDUCED FROM, UNIVERSAL TRANSVERSE MERCATOR PROJECTION BY U.S.G.S., "ORIGINAL SCALE" 1:250,000 1 INCH = 4 MILES

NOTE: THIS MAP IS NOT TO BE CONSTRUED AS AN OFFICIAL TRACT MAP. A SET OF 1:63,360 SCALE TRACT MAPS ARE AVAILABLE AT THE DEPT. OF NATURAL RESOURCES, DIVISION OF OIL AND GAS, 3601 C. ST., P.O. BOX 107034, ANCHORAGE, ALASKA 99510 PHONE (907) 762-4277

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

BILL SHEFFIELD, GOVERNOR

P.O. BOX 7034
ANCHORAGE, ALASKA 99510-7034

November 20, 1986

Phone: 762-4277

NOTICE
OF
SALE

STATE OF ALASKA
COMPETITIVE OIL AND GAS LEASE SALE 51 (PRUDHOE BAY UPLANDS)

The Department of Natural Resources, Division of Oil and Gas (DO&G), gives formal notice under AS. 38.05.945(a)(4) of its intention to offer lands for competitive oil and gas lease. Sale 51 includes 119 tracts with a total area of approximately 592,142 acres. The proposed sale area consists of onshore acreage located on the North Slope of Alaska, lying between the Canning River on the East and the Sagavanirktok River on the West. The entire sale area is within the North Slope Borough. The North Slope communities of Deadhorse/Prudhoe Bay, Nuiqsut, Barrow, and Kaktovik may be affected by the sale.

Included in this sale are 46 tracts that are being offered as "exempt" acreage under AS. 38.05.180(d)(1). Tracts 17-19, 44-47, 65-68, and 85-119 have been leased in previous state North Slope Oil and Gas lease Sales: Sale 14 (1965), Sale 31 (1980), and Sale 34 (1982).

Bidding Method
The bidding method for all tracts will be cash bonus bidding with a minimum bid of $2.00 per acre. All tracts will have a fixed royalty rate of 12.5 %.

Length of Lease
All leases issued as a result of sale 51 will have an initial primary term of 10 years.

Lease Form
All leases issued as a result of sale 51 will be executed on Form DO&G-01-86 (COMPETITIVE OIL AND GAS LEASE) which was revised in November 1986
The revision made in this lease form corrects an Alaska Statute citation in Paragraph 1, section (c) from AS 38.05.365(13) to AS 38.05.965(17).

Rental
Annual rental will be $1.00 per acre for the first year, $1.50 per acre for the second year, $2.00 per acre for the third year, $2.50 per acre for the fourth year, and $3.00 per acre for the fifth and following years.

Bids also be accepted from 9:00 a.m. to 4:00 p.m. on January 26, 1987 in Room 1380 (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska. Bids that are sent by mail must be sent to: Director, DO&G, P.O. Box 7034, Anchorage, Alaska 99510-7034, and must be received by 4:00 p.m., January 26, 1987. Bids that are sent by Federal Express, DHL, or any other delivery service must be received by 4:00 p.m., January 26, 1987, and should be addressed to: Director, DO&G, Room 1380, Frontier Building, 3601 "C" Street, Anchorage, Alaska. The envelope for each bid should be marked "State of Alaska Competitive Oil And Gas Lease Sale 51; not to be opened until 9:00 a.m., January 27, 1987; Tract #________."

In order to bid at the sale, bidders must pre-qualify no later than 4:30 p.m., January 26, 1987. Potential bidders should consult DO&G for pre-qualification requirements and procedures.

Under 11 AAC 82.445, a bid will not be considered unless supported by the bid deposit and the information required, unless any omission is determined by the Commissioner or his/her designee to be immaterial or due to excusable inadvertence, and the omission is corrected within one week after reciept of a notice of deficiency.

Additional Information

In support of this lease sale, the Director of the Division of Oil and Gas has prepared a written final finding and decision under AS 38.05 035(e) which sets forth the facts and applicable laws upon which he has determined that the proposed action will best serve the interests of the state. The Director's written finding and decision are availible at the Division of Oil and Gas, Frontier Building, 3601 "C" Street, Room 1398, in Anchorage or by writing DO&G at P.O. Box 7034, Anchorage, Alaska 99510-7034. Tract maps, Final Legal Descriptions and additional information on the proposed sale are available upon request to bidders and the public at DO&G during regular office hours. The cost for each set of tract maps is $50.00. Please make checks for these items payable to: Department of Revenue, State of Alaska.

The state reserves the right to delete tracts and to revise tract acreage at any time up to and including the day of the sale.

James E. Eason
Director

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

BILL SHEFFIELD, GOVERNOR

P.O. BOX 7034
ANCHORAGE, ALASKA 99510-7034

November 20, 1986

Sale 51
Information to Bidders

A. Acceptance and Rejection of Bids

The state hereby expressly reserves the right to reject any bid on any tract. No bid for any tract will be accepted, and no lease for any tract will be awarded to any bidder unless the following conditions have been met:

1. The bidder has complied with this notice and applicable state regulations and statutes.

2. The bid is the highest valid cash bonus bid.

3. The amount of the bid has been determined to be adequate by the Commissioner of Natural Resources.

In addition, no bid containing or accompanied by any condition, qualification or material alteration will be considered.

B. Pre-Qualification of Bidders

In order to submit bids for this sale, bidders must be pre-qualified to bid no later than 4:30 p.m., January 26, 1987. Qualification procedures are as follows:

1. Individuals - An individual bidder must have a Statement of Qualifications on file at DO&G certifying that he or she is at least 18 years old and a citizen of the United States or is eligible for and has filed for citizenship, or is an alien person entitled to a similar lease by virtue of a treaty between the United States and the nation of which the alien person is a citizen. The statement must include the bidder's name, address, and telephone number and must be signed and dated. If an agent is signing the bid form on behalf of an individual, an original or certified copy of a notarized power-of-attorney document evidencing the authority of the agent to act on behalf of the individual must be on file at DO&G. If a guardian, trustee, or legal representative of an individual is signing on behalf of that individual, a certified copy of the court order authorizing him to act in that capacity and to fulfill the individual's obligations arising under any lease issued to the individual must be on file at DO&G. A signed statement as to the citizenship and age of the guardian, trustee, or legal representative of the individual must also be submitted to DO&G.

In order to receive a Certificate of Authority, foreign corporations must submit a packet of completed forms entitled "Instructions for qualifying a foreign corporation to do business in the State of Alaska" to the Department of Commerce and Economic Development, Corporation Section, P.O. Box D, Juneau, Alaska 99811. This form can be obtained by writing or telephoning DO&G, P.O. Box 7034, Anchorage, Alaska, 99510 (907-762-4202). In order to receive a Certificate of Incorporation, domestic corporations must submit Articles of Incorporation to the Department of Commerce and Economic Development. Upon proper application, the Department of Commerce and Economic Development will issue a Certificate of Authority or Certificate of Incorporation. Please allow two to three weeks for the processing of these certificates.

4. Partnerships or Other Unincorporated Associations - A partnership or unincorporated association must submit the following documents to DO&G prior to the lease sale:

   a. A statement describing the business relationships between members or partners.

   b. A statement of qualifications for each member stating that each member is at least 18 years of age and a citizen of the United States, or is eligible for and has filed for citizenship, or is an alien person entitled to a similar lease by virtue of a treaty between the United States and the nation of which the alien person is a citizen.

   c. If an agent is signing the bid form on behalf of the partnership or association, an original or certified copy of a notarized power-of-attorney defining the agent's authority to sign the bid on behalf of the partnership or association.

C. Bid Submission

Bids will be received by the Director of the Division of Oil and Gas or his authorized agent in Room 1380 (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska, between the hours of 9:00 a.m. and 4:00 p.m. on January 26, 1987. Bids that are mailed to the Director, DO&G, P.O. Box 7034, Anchorage, Alaska 99510-7034 must be received no later than 4:00 p.m. January 26, 1987. Bids will also be received at the Division's temporary office in the Denali I Room at the Clarion Hotel, 4800 Spenard Road, in Anchorage between 8:00 a.m. and 9:00 a.m. on January 27, 1987. No bids will be received after 9:00 a.m., January 27, 1987.

Bids will be received and processed on January 27, 1987 in the following manner:

1. 8:00 a.m.- 9:00 a.m. - bids will be received in the "Denali I Room."

2. 9:00 a.m. - closing of bid submission.

3. 9:00 a.m.- 10:00 a.m. - opening of the bids by DO&G personnel. The opening of bids is for the sole purpose of publicly announcing and recording bids received. No bids will be accepted or rejected at this time.

E. Method of Handling Bid Deposits and Lease Awards

1. Bid deposits will be safeguarded against theft, misappropriation and loss. Receipt of a bid deposit by the state does not constitute and shall not be construed as acceptance of any bid on behalf of the state.

2. A bidder submitting a bid which is not the apparent high bid may pick up the bid deposit from 3:00 p.m. to 4:00 p.m., January 27, 1987, in Room 1398, (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska. Bid deposits also will be returned from 9:00 a.m. to 3:00 p.m. on January 28, 1987, in Room 1398, (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska. Bid deposits which have not been retrieved by 3:00 p.m., January 28, 1987 will be returned to the bidder by mail to the address shown on the bid form.

3. A bidder whose bid deposit for an apparent high bid is tendered by cashier's check, treasurer's check, or certified check drawn on a non-Alaska bank must wire transfer funds in the amount of such bid deposit on January 28, 1987, no later than noon Eastern Standard Time (8:00 a.m. Alaska Standard Time), to: First Pennsylvania Bank of Philadelphia, ABA # 031000024, for credit to State of Alaska, Account # 07/089250/00, Attn: Catherine Hess. It is not necessary that separate wire transfers be made if more than one bid deposit is being transferred to the account. Each apparent high bidder making a wire transfer to this account must Telex the following information to the Alaska Department of Revenue, Treasury Division (Telex No. 099-45-333) and the Department of Natural Resources, DO&G (Telex No. 090-25-360): the amount of each bid deposit comprising the wire transfer, the tract number to which each bid deposit applies, the originating bank of the wire transfer, and the name(s) of the bidder's partner(s), if any, on whose behalf a bid deposit is being wire transferred. Upon notification of receipt of a wire transfer, the cashier's check(s), treasurer's check(s) and certified check(s) for the bid deposit(s) corresponding to that wire transfer will be returned from 10:00 a.m. to 3:00 p.m., January 28, 1987 in Room 1380 (Thirteenth Floor) of the Frontier Building, 3601 "C" Street, Anchorage, Alaska.

4. If a bid deposit for an apparent high bid is tendered in cash, by money order, or is a certified, treasurer's, or cashier's check drawn on an Alaska bank, the bidder will not be required to wire transfer federal funds for that bid deposit. Such checks will be presented January 27, 1987, for payment in federal funds at the First National Bank of Anchorage.

5. Upon rejection by the State of Alaska of any apparent high bid, the amount of the bid deposit for that bid will be mailed to the bidder. A bidder who is unable to pick up a bid deposit in the manner described above may submit with the bid written instructions for return of the bid deposit.

MITIGATING MEASURES

AS 38.05.035(e) and the departmental delegation of authority provide the Director, Division of Oil and Gas, with the authority to impose conditions or limitations, in addition to those imposed by statute, to ensure that a resource disposal is in the state's best interests. Stipulations will be enforced throughout the term of the lease. Measures listed under "Plans of Operations and Other Terms of Sale" will be imposed through plans of operations and other permits to mitigate the social and environmental effects of lease activities. These measures were developed after considering stipulations and terms of sale proposed in the Sale 51 preliminary analysis and public and agency comment on them.

Lease Stipulations

1. Spill Prevention Control and Countermeasure Plan: Lessees are required to comply with federal guidelines (40 CFR 112.7; see Appendix 2) for the preparation and implementation of a spill prevention control and countermeasure plan.

2. Discovery of Historic or Archeologic Objects: In the event any site, structure, or object of historic or archeologic significance is discovered during operations on the leased area, the lessee must report immediately such findings to the Director, Division of Oil and Gas, and make every reasonable effort to preserve and protect such site, structure, or object from damage until the Director, Division of Oil and Gas, after consultation with the State Historic Preservation Officer, has given directions as to its preservation.

Plans of Operations and Other Terms of Sale

Lessees must submit a detailed plan of operations to the Division of Oil and Gas for approval before conducting any exploratory or development operations. Plans of operations must identify the specific measures, design criteria, and construction methods and standards that will be employed to meet the restrictions listed below. The lessee shall concurrently submit an informational copy of its plan of operations to the North Slope Borough. For those activities occurring on leases located in the coastal zone, review of plans of operations and other required permits will comply with coastal zone consistency review procedures established under 6 AAC 50. Except as indicated, the restrictions listed below do not apply to geophysical exploration on state lands; geophysical exploration activities are governed by 11 AAC 96. The following restrictions will be imposed on lands leased in this sale as a condition of the approval of plans of operations.

General:

1. Plans of operations for lease activities and specific permit applications which are subject to approval by the U.S. Corps of Engineers; which require a Certificate of Reasonable Assurance from the Department of Environmental Conservation; or which require other state agency authorizations must be submitted simultaneously for state agency review and approval at least 60 days prior to conducting the activities.

Facilities:

7. All permanent facilities, with the exception of approved road and pipeline crossings aligned perpendicular to watercourses, will be prohibited within 500 feet (152 m) of the active floodplain of the Sagavanirktok, Kadleroshilik, Shaviovik, Kavik, Staines, and Canning Rivers. Permanent facilities will be prohibited within 100 feet (30 m) of all other fishbearing streams and lakes unless the Director, Division of Oil and Gas, after consultation with the Department of Fish and Game, determines that such facilities placement will not significantly disturb sensitive wildlife habitats or that such a requirement is not feasible or prudent.

8. Measures will be required to minimize the impact of industrial development on key wetlands that are important to waterfowl and shorebirds. Key wetlands include shallow-Arctophilia (Class III), deep-Arctophilia (Class IV), and basin-complex wetlands (Class VI). Specific measures include the requirements that:

    a. Lessees must identify on a map or aerial photograph the largest surface area within which it is anticipated that a facility is to be sited, or an activity is to occur. The map or photograph must accompany the plan of operations submitted to the Division of Oil and Gas. The Division of Oil and Gas will consult with the Department of Fish and Game to identify the least environmentally sensitive area(s) within the industry-identified area of interest. The industry-identified surface area must be large enough to contain the facility and to accommodate planned expansion.

    b. Drill pads, roads, pipelines, and other facilities must be sited outside of key wetlands, unless the Director, Division of Oil and Gas, after consultation with the Department of Fish and Game, determines that there are no feasible or prudent alternatives.

    c. Where facilities must be sited within key wetlands, such facilities will be sited, designed, constructed, and maintained in a manner that will preserve natural hydrological patterns and prevent oil contamination.

    d. Draining or dewatering key wetlands is prohibited, unless no feasible or prudent alternative exists.

9. Impermeable lining and diking will be required for sewage ponds and oil storage facilities (with a storage capacity greater than 660 gallons). Buffer zones of not less than 100 feet (30 m) and up to 1,500 feet (457 m) will be required to separate oil storage facilities (with a capacity greater than 660 gallons) and sewage ponds from marine areas, freshwater supplies, streams, lakes, and Class III, IV, and VI wetlands unless the Director, Division of Oil and Gas, after consultation with the Department of Environmental Conservation, determines that such a requirement is not feasible or prudent. Sumps and reserve pits must be rendered impermeable and otherwise fully contained through diking or other means.

archeological, geological, and biological resources. The program must also be designed to increase the sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which such personnel will be operating. The lessee must also submit for review and approval a continuing technical environmental briefing program for its supervisory and managerial personnel and those of its agents, contractors, and subcontractors.

Access:

18. No restriction of public access to, or use of, the leased area will be permitted as a consequence of oil and gas activities except in the immediate vicinity of drill sites, buildings, and other related structures. Areas where access is to be restricted must be identified in the plan of operations. No lease facilities or operations may be located where they would block public access to or along navigable and public waters as defined in AS 38.05.965(12) and (16). If lease facilities will be located in the vicinity of these public waters, an easement will be reserved under AS 38.05.127 and 11 AAC 53.330 to ensure the right of public access.

19. Surface use will be restricted, as necessary, to prevent unreasonable conflicts with local subsistence harvests.

Third-party Interests:

20. If only the subsurface estate is owned by the state, or if the surface is owned by the state but subject to third party interests, the lessee must not enter upon such land until the lessee makes a good faith effort to agree with the surface interest holder on settlement of damages that may be caused by lease activities. If an agreement cannot be reached, the Director, Division of Oil and Gas, has the authority to approve the activity, provided adequate provisions have been made by the lessee with the state to pay for any damages the surface interest holder may suffer.

21. The activities proposed under a plan of operations must not unreasonably diminish the use and enjoyment of lands within a native allotment. Before entering a pending or approved native allotment, lessees must contact the Bureau of Indian Affairs and the Bureau of Land Management and obtain permission to enter, if required. Lessees must also comply with applicable federal law regarding native allotments.

Archeological and Historical Sites:

22. Prior to the construction or placement of any structure, road, or facility resulting from exploration, development, or production activities, the lessee must conduct an inventory of archeological and historical sites within the area affected by a proposed activity. Such inventory must consider literature provided by the North Slope Borough and local residents, documentation of oral history regarding historic and prehistoric uses of such sites, evidence of consultation with the Alaska Heritage Resources Survey and the National Register of Historic Places, and site surveys. The inventory must also include a detailed analysis of the potential effects estimated to result from the proposed activity. The

Explosives must not be detonated in close proximity to fishbearing waters unless the detonation produces a pressure rise in the waterbody of no more than 3 psi or the waterbody, including its substrate, is solidly frozen. The minimum acceptable offset from fishbearing waters for various size single charge detonations is:

1-2 pound charge --	80 feet
5 pound charge --	120 feet
10 pound charge --	170 feet
25 pound charge --	270 feet
100 pound charge --	530 feet.

Disposal of produced water, drilling muds, and cuttings:

24. Solid waste disposal into rivers, streams, natural lakes, and Class III, IV, and VI wetlands is prohibited. Before the lessee disposes of solid waste in other areas, the disposal must be approved through permits issued by Department of Environmental Conservation.

25. All garbage and refuse must be incinerated. Residue and nonburnables must be disposed of at an upland site approved by the Department of Environmental Conservation. No new solid fill disposal sites, except possibly for the disposal of drilling muds and cuttings, will be approved during the exploratory phase.

26. Discharge of produced water, drilling muds, and cuttings:

    a. Disposal of drilling muds and cuttings is subject to a Department of Environmental Conservation solid waste disposal permit and any guidelines and conditions accompanying the solid waste disposal permit. Disposal of wastewaters generated from drilling operations will be subject to a Department of Environmental Conservation wastewater disposal permit.

    b. Disposal of produced waters will be by subsurface disposal techniques, except that the Department of Environmental Conservation may permit alternate disposal methods if the department determines that subsurface disposal techniques are not feasible or prudent. Disposal of produced water to estuarine waters at river mouths and freshwater bodies, including Class III, IV, and VI wetlands, is prohibited.

    c. Discharge of drilling muds and cuttings to lakes, streams, rivers, tidally influenced mouths of rivers, and Class III, IV, and VI wetlands is prohibited. Disposal of muds and cuttings may be made into sumps and reserve pits approved through a solid waste disposal permit from the Department of Environmental Conservation.

Gravel Mining:

27. In meeting gravel needs for exploration, development, and production, gravel from nearby abandoned drill pads, roads, and airstrips, and existing material sites must be used first unless it is demonstrated to the Director, Division of Land and Water Management, after consultation with the Division of Oil and Gas and the Department of Fish and Game, that

with the U.S. Fish and Wildlife Service. All known nest sites will be considered active between April 15 and June 1. Known nest sites that have not been surveyed will be considered active throughout the summer season. Nest sites not having a peregrine falcon present by June 1 will be considered inactive, and oil and gas activities near inactive nests will not be subject to the restrictions listed under b, c, and d. Activities at existing development sites within two miles of newly established nests will not be subject to these restrictions.

a. Within one mile (1.6 km) of all nest sites -- Facilities, including but not limited to roads, pipelines, disposal sites, gravel mines, storage facilities, and camps will be prohibited.

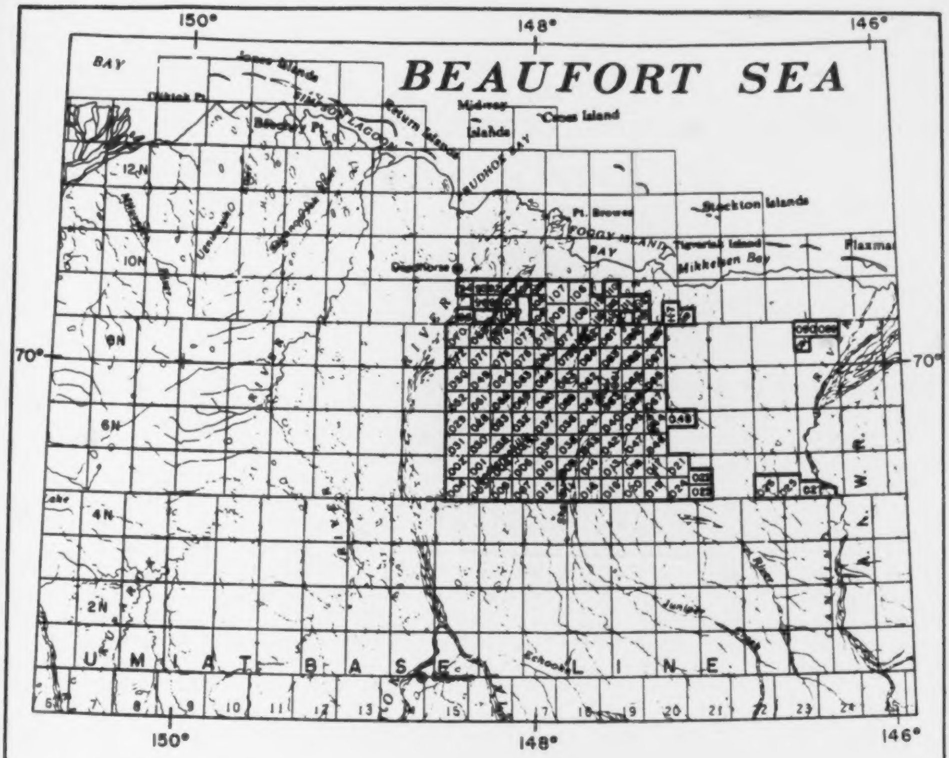
b. Within one mile (1.6 km) of active nest sites -- Between April 15 and August 31, surface entry will be prohibited and aircraft overflights must avoid nest sites by an altitude of 1500 feet (457 m) above nest level.

c. Within two miles (3.2 km) of active nest sites -- Noisy activities, including blasting and gravel washing, will be prohibited between April 15 and August 31. Airfields, construction camps, disposal sites, compressor stations, and other permanent facilities that occupy large areas, which are noisy, or which require sustained human occupancy will be prohibited.

d. Within 15 miles (24 km) of active nest sites -- Except for limited non-aerial applications of approved non-persistent insecticides, pesticide use will be prohibited.

32. a. To minimize impacts on caribou, pipelines must be consolidated to the extent feasible and must be designed, sited, and constructed to allow safe passage of caribou. Adequate elevation, ramping, or burial of pipelines will be required in areas identified by the Department of Fish and Game as important caribou movement zones.

b. Exploratory drilling operations may be restricted or prohibited on Tracts 89, 90, and 91 and on other tracts as necessary during the caribou calving period, generally May 15 through June 20. Development and production activities, with the exception of drilling, maintenance, and operation of production wells, may be restricted or prohibited on these tracts during the calving period, except that such activities will be allowed year-round in any core area of intense industrial activity. In order to assist the assist the Director, Division of Oil and Gas, in determining the necessity for restrictions, the lessee may be required to conduct caribou monitoring studies in consultation with the Department of Fish and Game.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148°
146°
BEAUFORT SEA
BAY
Jones Islands
Oliktok Pt.
Simpson Lagoon
Beechey Pt.
Return Islands
Midway Islands
Cross Island
Prudhoe Bay
Pt. Brower
Foggy Island Bay
Stockton Islands
Tigvariak Island
Mikkelsen Bay
Flaxman
Deadhorse
12N
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8N
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4N
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STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL & GAS

OIL AND GAS LEASE SALE 51
PRUDHOE BAY UPLANDS TRACT MAP

SCALE 1:1,000,000 1 inch = 16 Miles
10 0 10 20 30 40 50 Miles

ACTING DIRECTOR, DO&G JIM EASON	DRAWN BY O.D.S.	DATE APPROVED 8/18/86
LEASING MANAGER PAMELA ROGERS Pamela Rogers	CHECKED BY M.	[illegible] UNIVERSAL TRANSVERSE MERCATOR PROJECTION ON [illegible]

SALE AREA ☐

NOTE: THIS MAP IS NOT TO BE CONSTRUED AS AN OFFICIAL TRACT MAP. A SET OF 1:63,360 SCALE TRACT MAPS ARE AVAILABLE AT THE DEPT. OF NATURAL RESOURCES, DIVISION OF OIL AND GAS, 3601 C. ST., P.O. BOX 7034, ANCHORAGE, ALASKA 99510-7034 PHONE (907) 561-2020

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

STEVE COWPER, GOVERNOR

PO BOX 7034
ANCHORAGE, ALASKA 99510-7034

Phone: 762-2586

August 13, 1987

-NOTICE-
OF
FINAL FINDING AND DECISION UNDER AS 38.05.035(e)
REGARDING PROPOSED OIL AND GAS LEASE SALE 54 (KUPARUK UPLANDS)

The Department of Natural Resources, Division of Oil and Gas (DO&G), gives formal notice under AS 38.05.945(a)(3) of its intention to make a final finding and decision under AS 38.05.035(e) regarding the sale of oil and gas leases in proposed Oil and Gas Lease Sale 54 (Kuparuk Uplands). Before this sale may be held, the Director of the Division of Oil and Gas must make a written final decision that the sale serves the best interests of the state. This decision will set out the facts and applicable policies upon which the director bases his determination that the sale of oil and gas leases in proposed Sale 54 will or will not best serve the interests of the state. This final decision is expected to be available to the public in October 1987.

Proposed Oil and Gas Lease Sale 54 includes 108 tracts with a total area of approximately 507,979 acres. The proposed sale area consists of onshore acreage lying between the National Petroleum Reserve Alaska (NPRA) boundary and the area of state Kuparuk Uplands Sale 48. The entire sale area is within the North Slope Borough. The North Slope communities of Deadhorse/Prudhoe Bay, Nuiqsut, Barrow, and Kaktovik may be affected by the proposed sale.

Proposed Sale 54 includes approximately 53,186 acres of Colville River delta lands, which were previously contained in proposed exempt Oil and Gas Lease Sale 52A. In June 1986, Sale 52A was postponed from its original September 1986 sale date. The acreage within that sale area was combined with the lands proposed to be offered through Sale 54. This additional acreage consists of (1) approximately 30,481 acres of state selected lands that are Tentatively Approved (TA) by the federal government for conveyance to the State of Alaska, and (2) an additional 22,705 acres that are subject to a 1974 agreement between the Arctic Slope Regional Corporation (ASRC) and the State of Alaska. In 1974, ASRC and the state agreed that ASRC would exchange these lands and others in the area for approximately 65,000 acres of state owned land in the Point Lay area. The department has sought to implement the agreement. ASRC, however, no longer recognizes the validity of the agreement, and has brought suit against the department to nullify the agreement and prevent the subject lands from being leased by the state for oil and gas exploration and development. The inclusion of these lands in Sale 54, comprised of Tracts 91, 93, 94, 98, 99, 100 and 102, is conditional based upon an acceptable settlement in this case.

The tracts added to Sale 54 from Sale 52A are being offered as "exempt" acreage under the terms of AS 38.05.180(d), which allows the Commissioner of the Department of Natural Resources to issue oil and gas leases in an area that has not been included in the state's five-year leasing program, if the land to be leased (1) was previously subject to a valid state or federal oil

Comments should be mailed to DO&G, P.O. Box 107034, Anchorage, Alaska 99510-7034, Attention: Pam Rogers. Comments should be received at DO&G by September 18, 1987 in order to be considered in the final decision of whether or not this sale is to be held. The final ACMP consistency determination will be included in the Final Finding and Decision of the Director. Preliminary legal descriptions for Sale 54 are available upon request to potential bidders and the public at DO&G. Preliminary Tract Maps are also available at a cost of $50 per set.

If a decision is made that the proposed sale best serves the interest of the state, an "Information to Bidders" packet will be made available in October 1987. If a decision is made to hold the sale, it is tentatively scheduled to occur at the William A. Egan Civic and Convention Center, 555 West Fifth Avenue, in Anchorage, on January 26, 1988 in accordance with AS 38.05.180.

James E. Eason
Director

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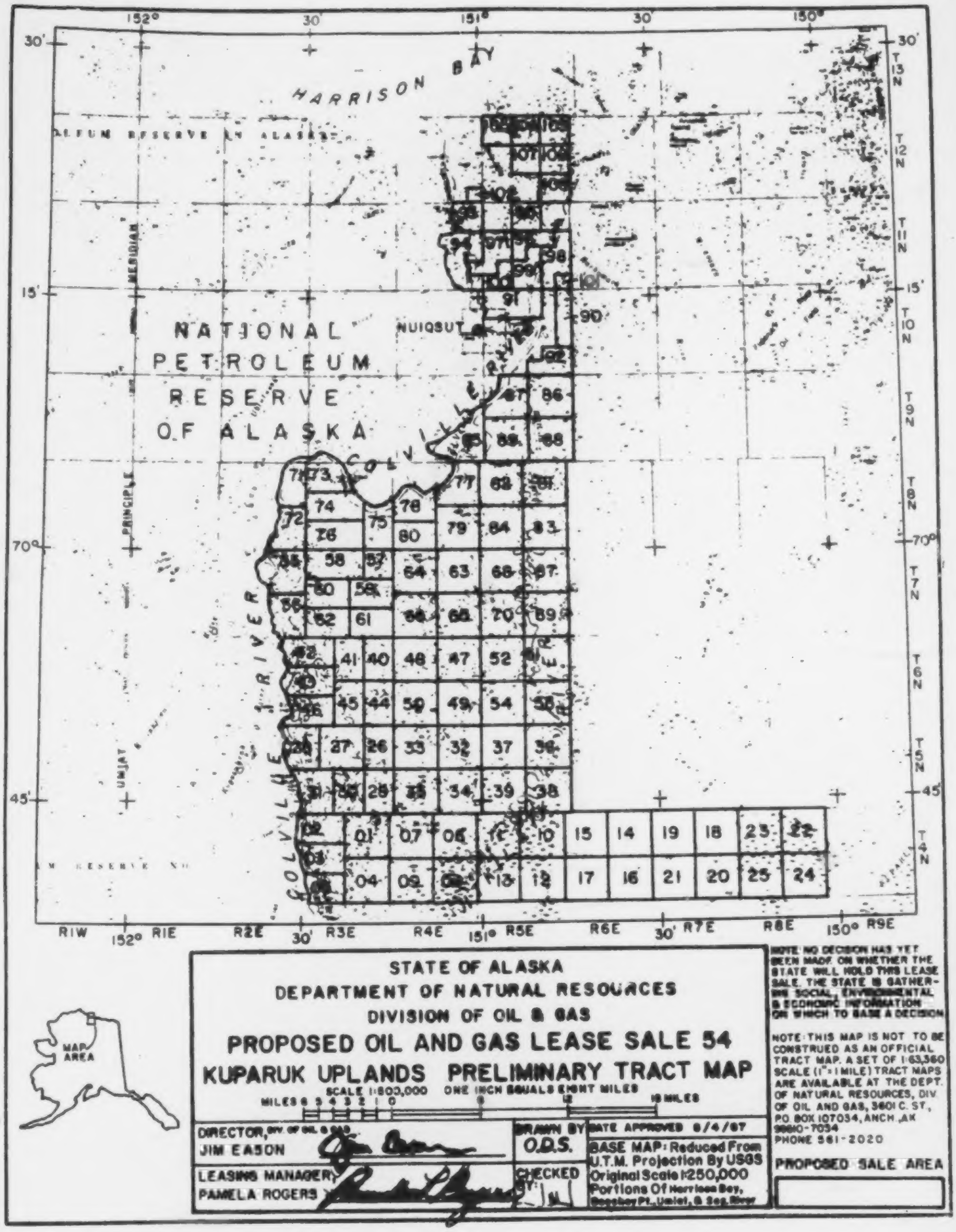
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30'
151°
30'
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30'
15'
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45'
HARRISON BAY
NATIONAL
PETROLEUM
RESERVE
OF ALASKA
NUIQSUT
COLVILLE RIVER
UMIAT
PRINCIPLE MERIDIAN
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R5E
R6E
R7E
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MAP AREA
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STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL & GAS

PROPOSED OIL AND GAS LEASE SALE 54
KUPARUK UPLANDS PRELIMINARY TRACT MAP

SCALE 1:500,000 ONE INCH EQUALS EIGHT MILES
MILES 6 5 4 3 2 1 0 6 12 18 MILES

DIRECTOR, DIV. OF OIL & GAS
JIM EASON

LEASING MANAGER
PAMELA ROGERS

DRAWN BY
O.D.S.

CHECKED BY:

DATE APPROVED 8/4/87

BASE MAP: Reduced From U.T.M. Projection By USGS Original Scale 1:250,000 Portions Of Harrison Bay, Beechey Pt., Umiat, & Sag. River

NOTE: NO DECISION HAS YET BEEN MADE ON WHETHER THE STATE WILL HOLD THIS LEASE SALE. THE STATE IS GATHERING SOCIAL, ENVIRONMENTAL & ECONOMIC INFORMATION ON WHICH TO BASE A DECISION.

NOTE: THIS MAP IS NOT TO BE CONSTRUED AS AN OFFICIAL TRACT MAP. A SET OF 1:63,360 SCALE (1" = 1 MILE) TRACT MAPS ARE AVAILABLE AT THE DEPT. OF NATURAL RESOURCES, DIV. OF OIL AND GAS, 3601 C. ST., P.O. BOX 107034, ANCH., AK 99510-7034
PHONE 561-2020

PROPOSED SALE AREA

PROPOSED MITIGATING MEASURES FOR SALE 54

AS 38.05.035(e) and the departmental delegation of authority provide the Director, Division of Oil and Gas, with the authority to impose conditions or limitations, in addition to those imposed by statute, to ensure that a resource disposal is in the state's best interests. If adopted, stipulations will be enforced throughout the term of the lease and measures listed under "Proposed Permit Terms" will be imposed through plans of operations and other permits to mitigate the social and environmental effects of lease activities. These proposed measures were developed after considering stipulations and terms of sale imposed in other North Slope sales; fish and wildlife resource and harvest data submitted by the Alaska Department of Fish and Game; environmental data relating to air and water quality, solid waste disposal, and oil spills submitted by the Alaska Department of Environmental Conservation; and comments submitted by the public, the North Slope Borough, and other federal, state, and local agencies.

Proposed Lease Stipulations

1. Spill Prevention Control and Countermeasure Plan: Lessees are required to comply with federal guidelines (40 CFR 112.7) for the preparation and implementation of a spill prevention control and countermeasure (SPCC) plan. On addition to addressing the prevention, detection, and cleanup of oil, the SPCC plan for drilling operations should include, but not be limited to, methods for controlling blowouts, location of spill cleanup equipment, identification and location of a suitable alternative drilling rig, and the time required to obtain equipment, mobilize, rig-up, and commence drilling of a relief well, if needed.

2. Discovery of Historic or Archeologic Objects: In the event any site, structure, or object of historic or archeologic significance is discovered during operations on the leased area, the lessee must report immediately such findings to the Director, Division of Oil and Gas, and make every reasonable effort to preserve and protect such site, structure, or object from damage until the Director, Division of Oil and Gas, after consultation with the State Historic Preservation Officer, has given directions as to its preservation.

Plans of Operations and Other Proposed Terms of Sale

Lessees must submit a detailed plan of operations to the Division of Oil and Gas for approval before conducting any exploratory or development operations. Plans of operations must identify the specific measures, design criteria, and construction methods and standards that will be employed to meet the restrictions listed below. The lessee shall concurrently submit an informational copy of its plan of operations to the North Slope Borough. For those activities occurring on leases located in the coastal zone, review of plans of operations and other required permits will comply with coastal zone consistency review procedures established under 6 AAC 50. Except as indicated, the restrictions listed below do not apply to geophysical exploration on state lands; geophysical exploration activities are governed by 11 AAC 96. The following restrictions will be imposed on lands leased in this sale as a condition of the approval of plans of operations.

General:

1. Plans of operations for lease activities and specific permit applications which are subject to approval by the U.S. Corps of Engineers; which require a Certificate of Reasonable Assurance from the Alaska Department of Environmental Conservation; or which require other state agency authorizations must be submitted simultaneously for state agency review and approval at least 60 days prior to conducting the activities.

2. Bidders are advised that the North Slope Borough (NSB) Assembly has adopted a comprehensive plan and land management regulations under AS 29. The regulations require NSB approval for certain activities necessary for exploration and development of the lease. The state may not in all instances accept this assertion of jurisdiction.

3. All lease-related activities in the coastal zone are subject to the standards of the Alaska Coastal Management Program (ACMP) (6 AAC 80) and to the provisions of all approved coastal management plans. The Division of Oil and Gas will require, as a condition for consistency approval of lease operations, such modification or stipulations as may be necessary to ensure consistency with the Alaska Coastal Management Program, and with sound planning and management of coastal zone resources.

4. Except for approved off-road travel, exploration activities must be supported only by ice roads, winter trails, existing road systems, or air service. Wintertime off-road travel across tundra and wetlands may be approved in areas where snow and frost depth are sufficient to protect the ground surface. Summertime off-road travel across tundra and wetlands may be approved subject to time periods and vehicle types approved by the Division of Land and Water Management. Exceptions may be granted by the Director, Division of Land and Water Management, and the Director, Division of Oil and Gas, if an emergency condition exists or if it is determined, in consultation with the Alaska Department of Fish and Game, that travel can be accomplished without damaging vegetation or the ground surface.

5. An application for water rights must be submitted to the Alaska Department of Natural Resources prior to diverting, impounding, or withdrawing water from any ground or surface source. The lessee will be responsible for ensuring that an adequate supply of water is available for winter use through development of such means as storage reservoirs and snow melting. A permit must also be obtained from the Alaska Department of Fish and Game prior to using, diverting, obstructing, polluting, or changing the natural flow or bed of a designated anadromous waterbody (AS 16.05.870) or obstructing fish passage (AS 16.05.840).

6. The following provisions will govern aircraft operations in and near the sale area:

   a. From May 15 through September 30, aircraft must fly at altitudes greater than 1,500 feet (457 m) or at a lateral distance of one mile around barrier islands, lagoon areas, river deltas, and wetlands within one mile of the Beaufort Sea coast (excluding take-offs and landings).

b. From May 15 to June 20, aircraft flying within 30 miles of the coast between the Colville and Sagavanirktok Rivers must avoid caribou by an altitude of 1,500 feet (457 m) or a lateral distance of one mile (excluding take-offs and landings).

c. Human safety will take precedence over flight restrictions.

Facilities:

7. All permanent facilities, with the exception of approved road and pipeline crossings aligned perpendicular to watercourses, will be prohibited within 500 feet (152 m) of the active channel of the Colville and Itkillik Rivers. Permanent facilities will be prohibited within 100 feet (30 m) of all other fishbearing streams and lakes unless the Director, Division of Oil and Gas, after consultation with the Alaska Department of Fish and Game, determines that such facilities placement will not significantly disturb sensitive wildlife habitats or that such a requirement is not feasible or prudent.

8. Measures will be required to minimize the impact of industrial development on key wetlands that are important to waterfowl and shorebirds. Key wetlands include shallow-Arctophilia (Class III), deep-Arctophilia (Class IV), basin-complex wetlands (Class VI), and coastal wetlands (Class VIII). Specific measures include the requirements that:

   a. Lessees must identify on a map or aerial photograph the largest surface area within which it is anticipated that a facility is to be sited, or an activity is to occur. The map or photograph must accompany the plan of operations submitted to the Division of Oil and Gas. The Division of Oil and Gas will consult with the Alaska Department of Fish and Game to identify the least environmentally sensitive area(s) within the industry-identified area of interest. The industry-identified surface area must be large enough to contain the facility and to accommodate planned expansion.

   b. Drill pads, roads, pipelines, and other facilities must be sited outside of key wetlands, unless the Director, Division of Oil and Gas, after consultation with the Alaska Department of Fish and Game, determines that there are no feasible or prudent alternatives.

   c. Where facilities must be sited within key wetlands, such facilities will be sited, designed, constructed, and maintained in a manner that will preserve natural hydrological patterns and prevent oil contamination.

   d. Draining or dewatering key wetlands is prohibited, unless no feasible or prudent alternative exists.

9. Impermeable lining and diking will be required for sewage ponds and oil storage facilities with a storage capacity greater than 660 gallons. Buffer zones of not less than 100 feet (30 m) and up to 1,500 feet (457 m) will be required to separate oil storage facilities (with a capacity greater than 660 gallons) and sewage ponds from marine areas, freshwater supplies, streams, lakes, and Class III, IV, VI and VIII wetlands unless the Director, Division of Oil and Gas, after consultation with the Alaska

Department of Environmental Conservation, determines that such a requirement is not feasible or prudent. Sumps and reserve pits must be rendered impermeable and otherwise fully contained through diking or other means.

10. To the extent feasible and prudent, all lease activities will be conducted and all structures will be designed, sited, and constructed to maintain normal water flow and drainage patterns and to allow free movement and safe passage of fish and mammals.

11. Facilities and surface transportation routes will, to the extent feasible and prudent, be sited and consolidated to avoid sensitive fish and wildlife habitat.

12. Exploration facilities, with the exception of drill pads, must be temporary and must not be constructed of gravel. Reuse of existing abandoned gravel structures may be permitted on a case-by-case basis by the Director, Division of Oil and Gas, after consultation with the Director of the Division of Land and Water Management and the Alaska Department of Fish and Game. Approval for use of abandoned structures will depend on the extent and method of restoration needed to return these structures to a usable condition.

13. Pipelines must be located so as to facilitate the containment and cleanup of spilled hydrocarbons. Where feasible and prudent, pipelines must be located on the upslope side of roadways and construction pads unless the Director, Division of Land and Water Management, determines that an alternative site is environmentally acceptable.

14. Except for those on approved exploratory drill sites, stationary fuel storage facilities must not be placed, nor vehicle refueling occur, within active floodplains. Exceptions may be allowed for the refueling of slow-moving construction equipment.

15. Upon abandonment of drilling sites, roads, buildings, airstrips or other facilities, such facilities must be removed and the site rehabilitated, unless the Director, Division of Oil and Gas, after consultation with the Alaska Departments of Fish and Game and Environmental Conservation, determines that such removal and rehabilitation is not in the state's best interests.

Local Hire:

16. The lessee is encouraged to hire and employ local and Alaska residents and companies, to the extent they are available and qualified, for work performed on the leased area.

Environmental Training:

17. The lessee must include in any exploration or development plan a proposed environmental training program for all personnel involved in exploration or development activities (including personnel of the lessee's contractors and subcontractors) for review and approval by the Director, Division of Oil and Gas. The program must be designed to inform each person working on the project of specific types of environmental, social, and cultural

concerns which relate to the individual's job. The program must be formulated and implemented by qualified instructors experienced in each pertinent field of study and must employ effective methods to ensure that personnel understand and use techniques necessary to preserve archeological, geological, and biological resources. The program must also be designed to increase the sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which such personnel will be operating. The lessee must also submit for review and approval a continuing technical environmental briefing program for its supervisory and managerial personnel and those of its agents, contractors, and subcontractors.

Access:

18. No restriction of public access to, or use of, the leased area will be permitted as a consequence of oil and gas activities except in the immediate vicinity of drill sites, buildings, and other related structures. Areas where access is to be restricted must be identified in the plan of operations. No lease facilities or operations may be located where they would block public access to or along navigable and public waters as defined in AS 38.05.965(12) and (16). If lease facilities will be located in the vicinity of these public waters, an easement will be reserved under AS 38.05.127 and 11 AAC 53.330 to ensure the right of public access.

19. Surface use will be restricted, as necessary, to prevent unreasonable conflicts with local subsistence harvests.

Third-party Interests:

20. If only the subsurface estate is owned by the state, or if the surface is owned by the state but subject to third party interests, the lessee must not enter upon such land until the lessee makes a good faith effort to agree with the surface interest holder on settlement of damages that may be caused by lease activities. If an agreement cannot be reached, the Director, Division of Oil and Gas, has the authority to approve the activity, provided adequate provisions have been made by the lessee with the state to pay for any damages the surface interest holder may suffer.

21. The activities proposed under a plan of operations must not unreasonably diminish the use and enjoyment of lands within a native allotment. Before entering a pending or approved native allotment, lessees must contact the Bureau of Indian Affairs and the Bureau of Land Management and obtain permission to enter, if required. Lessees must also comply with applicable federal law regarding native allotments.

Archeological and Historical Sites:

22. Prior to the construction or placement of any structure, road, or facility resulting from exploration, development, or production activities, the lessee must conduct an inventory of archeological and historical sites within the area affected by a proposed activity. Such inventory must consider literature provided by the North Slope Borough and local residents, documentation of oral history regarding historic and prehistoric uses of such sites, evidence of consultation with the Alaska

Heritage Resources Survey and the National Register of Historic Places, and site surveys. The inventory must also include a detailed analysis of the potential effects estimated to result from the proposed activity. The inventory must be submitted to the Director, Division of Oil and Gas, for distribution to the Director of the Division of Parks and Outdoor Recreation and the Mayor of North Slope Borough for purposes of review and comment. In the event that an archeological or historical site or area may be adversely affected by an activity, the Director, Division of Oil and Gas, after consultation with the Director of the Division of Parks and Outdoor Recreation and the North Slope Borough, will direct the lessee as to what course of action will be necessary to mitigate the adverse effect.

Fishbearing Streams:

23. The measures listed below will be imposed by the Alaska Department of Fish and Game under AS 16 to protect anadromous streams. Similar provisions will be imposed by the Alaska Department of Natural Resources to protect nonanadromous fishbearing streams. Exceptions to these requirements may be allowed on a case-by-case basis by the agency having jurisdiction. Lessees are advised that the Colville and Itkillik Rivers are documented anadromous streams. Specific information on the location of anadromous waterbodies in and near the sale area may be obtained from the Alaska Department of Fish and Game.

    a. Alteration of river banks will be prohibited.

    b. Except for approved stream crossings, equipment must not be operated within willow stands (Salix spp.).

    c. The operation of equipment, excluding boats, in open water areas of rivers and streams will be prohibited.

    d. Bridges must be used as watercourse crossings whenever feasible. Culverts may be used only when bridges are shown not to be feasible or prudent. If approved, culverts must be installed so as not to block fish passage. The siting, design, and construction of both bridges and culverts must be approved prior to the placement of either of these structures.

    e. Removal of freshwater or snow cover from fishbearing rivers, streams, and natural lakes will be prohibited from freeze-up until spring break-up unless approved by the Division of Land and Water Management and the agency having jurisdiction. Compaction of snow cover overlying fishbearing waterbodies will be prohibited except for approved perpendicular crossings. If ice thickness is not sufficient to facilitate a crossing, ice and/or snow bridges will be required.

    f. Water intake pipes used to remove water from fishbearing rivers and lakes must be surrounded by a screened enclosure to prevent fish entrainment and impingement. Pipes and screening must be designed and constructed so that the maximum water velocity at the surface of the screen enclosure is no greater than 0.1 foot per second. Screen mesh size shall not exceed 0.04 inch.

g. To protect fish and other aquatic fauna, geophysical surveys in freshwater will require the use of nonexplosive energy sources. Explosives must not be detonated in close proximity to fishbearing waters unless the detonation produces a pressure rise in the waterbody of no more than 3 psi or the waterbody, including its substrate, is solidly frozen. The minimum acceptable offset from fishbearing waters for various size single charge detonations is:

1-2 pound charge -- 80 feet
5 pound charge -- 120 feet
10 pound charge -- 170 feet
25 pound charge -- 270 feet
100 pound charge -- 530 feet.

Disposal of produced water, drilling muds, and cuttings:

24. Excluding muds and cuttings (see Term 26), solid waste disposal into rivers, streams, natural lakes, and Class III, IV, VI, and VIII wetlands is prohibited. Before the lessee disposes of solid waste in other areas, the disposal must be approved through permits issued by the Alaska Department of Environmental Conservation.

25. All garbage and refuse must be incinerated. Residue and nonburnables must be disposed of at an upland site approved by the Alaska Department of Environmental Conservation. No new solid fill disposal sites, except possibly for the disposal of drilling muds and cuttings, will be approved during the exploratory phase.

26. Discharge of produced water, drilling muds, and cuttings:

a. Disposal of drilling muds and cuttings is subject to an Alaska Department of Environmental Conservation solid waste disposal permit and any guidelines and conditions accompanying the solid waste disposal permit. Disposal of wastewaters generated from drilling operations will be subject to an Alaska Department of Environmental Conservation wastewater disposal permit.

b. Disposal of produced waters will be by subsurface disposal techniques, except that the Alaska Department of Environmental Conservation may permit alternate disposal methods if the department determines that subsurface disposal techniques are not feasible or prudent. Disposal of produced water to intertidal habitat, estuarine waters at river mouths, and freshwater bodies, including Class III, IV, VI, and VIII wetlands, is prohibited.

c. Discharge of drilling muds and cuttings to lakes, streams, rivers, intertidal habitat, tidally influenced mouths of rivers, and Class III, IV, VI, and VIII wetlands is prohibited. Disposal of muds and cuttings may be made into sumps and reserve pits approved through a solid waste disposal permit from the Alaska Department of Environmental Conservation.

Gravel Mining:

27. In meeting gravel needs for exploration, development, and production, gravel from nearby abandoned drill pads, roads, and airstrips, and existing material sites must be used first unless it is demonstrated to the Director, Division of Land and Water Management, after consultation with the Division of Oil and Gas and the Alaska Department of Fish and Game, that use of these sources is not feasible or prudent or in the state's best interests. The Alaska Oil and Gas Conservation Commission will be consulted when gravel is to be removed from a wellhead.

28. Gravel mining sites required for exploration activities must not be located within an active floodplain of watercourses, unless the Director, Division of Land and Water Management, after consultation with the Alaska Department of Fish and Game, determines that no feasible and prudent alternative exists and that a floodplain source will cause the least adverse environmental impact. Mining site development and rehabilitation within floodplains must follow the procedures outlined in Gravel Removal Guidelines Manual For Arctic and Subarctic Floodplains, 1980, U.S. Fish and Wildlife Service, Woodward Clyde Consultants. Alaska Department of Fish and Game approval is required if the mining site is located within an anadromous stream (AS 16.05.870) or could block fish passage (AS 16.05.840).

29. Gravel mining sites required for development activities will be restricted to the minimum number of upland sites needed to develop the field efficiently and with minimal environmental damage. Where feasible and when large quantities of water will be needed for domestic or industrial use, upland gravel sites must be designed and constructed to function as reservoirs for future use. Gravel mining will not be allowed from active floodplains during development and production, unless the Director, Division of Land and Water Management, after consultation with the Alaska Department of Fish and Game, determines that there is no other feasible and prudent alternative and, if applicable, AS 16 requirements are met.

Special Areas:

30. Prior to initiating any field activities which could impact denning polar bears, lessees must consult with the appropriate state and federal agencies to acquire the most recent information on possible locations of den sites and the location of any radio-tagged bears. Winter travel routes and exploration activities must avoid preferred polar bear denning habitat unless human safety dictates otherwise. Onshore, polar bears den within 25 miles (40 km) of the coastline in deeply drifted areas (6 ft. or greater) adjacent to the cutbanks of drainages. The use of explosives will be prohibited within 1/4 mile (0.4 km) of cutbanks identified by the Alaska Department of Fish and Game. Exploration activities within one mile (1.6 km) of documented, active polar bear dens may be restricted or prohibited during plan of operations approval. If the lessee encounters polar bear dens in the field, the lessee must immediately report the den(s) to the Director, Division of Oil and Gas, and subsequently avoid the den(s).

31. Peregrine falcon nesting sites are known to occur near the Sale 54 area and may occur within the Sale 54 area. Lessees are advised that disturbing a peregrine falcon nest violates federal law. If the lessee discovers active peregrine falcon nest sites, the lessee must immediately report the nest locations to the Director, Division of Oil and Gas. To comply with state and federal endangered species acts, the following restrictions will apply in the vicinity of peregrine falcon nests sites, except as approved by the Alaska Department of Natural Resources in consultation with the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service. All known nest sites will be considered active between April 15 and June 1. Known nest sites that have not been surveyed will be considered active throughout the summer season. Nest sites not having a peregrine falcon present by June 1 will be considered inactive, and oil and gas activities near inactive nests will not be subject to the restrictions listed under b, c, and d. Activities at existing development sites within two miles (3.2 km) of newly established nests will not be subject to these restrictions.

    a. Within one mile (1.6 km) of all nest sites -- Facilities, including but not limited to roads, pipelines, disposal sites, gravel mines, storage facilities, and camps will be prohibited.

    b. Within one mile (1.6 km) of active nest sites -- Between April 15 and August 31, surface entry will be prohibited and aircraft overflights must avoid nest sites by an altitude of 1500 feet (457 m) above nest level. Human safety will take precedence over flight restrictions.

    c. Within two miles (3.2 km) of active nest sites -- Noisy activities, including blasting and gravel washing, will be prohibited between April 15 and August 31. Airfields, construction camps, disposal sites, compressor stations, and other permanent facilities that occupy large areas, which are noisy, or which require sustained human occupancy will be prohibited.

    d. Within 15 miles (24 km) of active nest sites -- Except for limited non-aerial applications of approved non-persistent insecticides, pesticide use will be prohibited.

32. To minimize impacts on caribou, pipelines must be consolidated to the extent feasible and must be designed, sited, and constructed to allow safe passage of caribou. These measures may include elevation or burial of pipelines, ramping, separation of roads and pipelines, traffic control, and siting of facilities away from important caribou movement zones.

33. All Sale 54 acreage in the Colville River Delta (Tracts 95, 96, 99, 100, and 102 to 108 and portions of Tracts 91, 93, 94, 97, and 98) will be subject to the following terms and conditions designed to maintain the production and harvest of key fish and wildlife species in the delta. When considering modifications to these terms and conditions, the Director of the Division of Oil and Gas will consult with and give due deference to comments and recommendations received from the Alaska Department of Fish and Game, the Alaska Department of Environmental Conservation, and the Division of Land and Water Management. When considering a request for a waiver or modification of these terms, environmental values and wildlife harvest will be given great weight and will take precedence unless there is a significant public need for the proposed use or activity; there is no feasible or prudent alternative to meet the public need for the proposed

use or activity which would conform to Sale 54 terms and conditions; and all feasible and prudent steps to maximize conformance with Sale 54 terms and conditions have been taken.

a. All onshore exploration activities will be restricted to the period between October 1 through April 30 unless the director determines that an extension can be granted to May 15.

b. During development and production, all major construction activities including, but not limited to, facility, road and pad construction, gravel washing and blasting, will be restricted to the period between October 1 through April 30 unless the director determines that summer construction will cause the least adverse environmental impact.

c. The surface movement of equipment and personnel may be restricted from May 15 to October 1. All authorized surface movement of equipment and personnel during this period must be on established roads and must be consolidated and scheduled to minimize disturbance to waterfowl. The necessity and conditions for limiting equipment and personnel movement will be identified on a case-by-case basis during review of plans of operations.

d. Material extraction on the delta will be prohibited unless the director determines that material extraction from the delta will cause the least adverse environmental impact.

e. Facilities and activities within the Colville River Delta to support industrial operations located outside the delta will be prohibited unless the director determines that the siting of facilities and activities in the delta will cause the least adverse environmental impact.

f. Permanent facilities will be prohibited within black brant colonies and the traditional black brant brood rearing area unless the director determines the siting of permanent facilities in these areas will cause the least adverse environmental impact.

g. To provide additional swan protection, drill pads, roads and other facilities must be sited outside of Class III wetlands.

h. To provide additional protection to yellow-billed loons, permanent facilities will be prohibited in the immediate vicinity of large, clear lakes located in the delta unless the director determines that such placement will cause the least adverse environmental impact.

The CHAIRMAN. Thank you very much. I happen to agree with you. I do not know how much sentiment there is on the committee, but I think the record is very strong that, as a practical matter, we have neither the money nor the expertise to undertake an exploratory program. Either you do not do enough or it costs too much. If you do enough, you might drill in the wrong place. We have been into those arguments, but I very much agree with you.

Mr. Sanderson, you state concern with the Murkowski bill that it shortcuts the EIS process. Now, would you agree with me that it would be prudent to go ahead and treat the programmatic EIS that has already been filed as sufficient solely for the purpose of making the initial determination as to lease, but that we should have the full EIS process thereafter on specific lease sales?

Mr. SANDERSON. Absolutely.

The CHAIRMAN. And on the question of the pace of lease sales, I mean whether we should—the kind of leasing program we ought to have—how much is leased each year and the size of the tracks and the sequencing and all of that?

Mr. SANDERSON. Senator, we would suggest that the model that the Minerals Management Service has used for its outer continental lease sale has been an equitable arrangement. When coupled with their complete NEPA process, it has been working.

This has been the area that we discussed with Mr. Horn and with Interior, and we would agree with you along that line also.

The CHAIRMAN. Would they be in agreement with you? Is there any difference between you two on that?

Mr. SANDERSON. From his statement today and from his testimony and from our discussions with him, I do not think so.

The CHAIRMAN. But you do agree that the programmatic EIS already completed is sufficient for that purpose?

Mr. SANDERSON. We think that the programmatic EIS, in combination with the comments that Robie Russell and his staff from Seattle and Mr. Ewing from the Alaska Operations Office have provided, have given the Congress an opportunity to look at the 1002 report as a programmatic EIS, with sufficiently more data than we saw in it originally.

The CHAIRMAN. So we do not need a new EIS to determine whether we should go forward, but the next EIS ought to be on the leasing program itself?

Mr. SANDERSON. As Mr. Russell has said, the document that was presented to you in his estimation needed to be upgraded. We think that these hearings have helped do that, and we think now that you are in a position to make the kind of determination that you need on the future of ANWR.

The CHAIRMAN. Now, aside from—in order to achieve that, we would need the language declaring the programmatic EIS as being sufficient for the one purpose of deciding to go forward. But other than that, is the NEPA sufficient fully to define where each EIS or impact statement assessment should be taken?

Mr. SANDERSON. Senator, we do not think so. We think there needs to be a site specific EIS for each lease sale.

The CHAIRMAN. Must that be detailed in the legislation, or does NEPA cover it?

Mr. **Sanderson**. NEPA covers it, as long as Congress incorporates NEPA into the whole process.

The **Chairman**. That is what I mean. We do not need further to detail the requirements of NEPA.

Mr. **Sanderson**. Senator, I think some of the language in this bill, as Mr. Horn pointed out, may have some ambiguity attached to it.

We think that the record needs to clarify that language and show that NEPA does fully apply at the lease sale.

The **Chairman**. I happen to agree that each lease sale ought to have the requirement of NEPA.

The more site-specific you get, the greater the requirements, it seems to me, of NEPA because that is where it really makes a difference.

Mr. **Sanderson**. We agree.

The **Chairman**. Well, I wish you could give us some written comments as to who we should clear up NEPA in that respect.

Mr. **Sanderson**. We would be pleased to.

[The information follows:]

Response for the Record of Richard Sanderson
Concerning the Applicability of NEPA to ANWR Matter

In response to inquiries by the Committee regarding the NEPA process as it is addressed in S. 1217, EPA is primarily concerned about the implications of section 288(b)(2) of the bill. That section would preclude further NEPA analysis prior to oil and gas lease sales on lands within the 1002 area. It is EPA's experience that the present Department of the Interior (DOI) requirement for preparation of lease sale environmental impact statements (EIS) for oil and gas activities on Department lands is efficient as well as workable and can be used to best determine the acceptability of potential environmental impacts associated with oil and gas leasing activities in ANWR.

Concerning the utility of the present NEPA disclosure process as employed for Outer Continenal Shelf (OCS) oil and gas activities, it is clear that while some change would be necessary to accommodate the onshore nature of ANWR lease sales, the present OCS leasing process provides a useful analogy for activities in the 1002 area. Under the Outer Continental Shelf Lands Act the DOI develops a 5-year Oil and Gas Leasing Program with accompanying EIS documents. The 5-year Plan goes through an extensive review process and is reviewable by Congress. Once the 5-year Plan is approved, each individual lease sale in the program is also the subject of an EIS.

The lease sale EIS begins with a call for information and nominations from prospective bidders. DOI then initiates the scoping process. The draft EIS focuses analysis on the specific area identified by interest indicated by industry and the area of hydrocarbon potential as identified by the Minerals Management Service (MMS). Preparation of the draft EIS and selection of the lease sale area is also guided by comments received during the pre-lease sale scoping process. Once the draft EIS is prepared and released there is a sixty-day period during which appropriate governmental agencies as well as industry representatives and the public may formally comment on information contained in the document. Public hearings are also held to discuss issues of concern.

Comments received by MMS during the draft EIS public comment period and the public hearings are considered in preparation of the final EIS. Once the final EIS is formally issued, there is a thirty-day period before MMS can proceed with decisions regarding the proposed lease sale. MMS follows the NEPA process with a proposed and final notice of sale. This document reflects the final EIS and other decision documents as well as comments by the Governor of the appropriate State(s). The formal lease sale is held at least thirty days after the final notice of sale is published.

The CHAIRMAN. Finally, the gentlemen from Alaska, and I will give this question to you generally.

Each of you feel that we need a joint Federal approach. Mr. Ott talked of joint Federal approach. Mr. Dietrick talked of coordinated State-Federal approach. Should that be spelled out in the legislation?

Dr. OTT. Mr. Chairman, I think it should be. I think a lot of the basis for my recommendation involves the fact that I was involved during the pre-construction phases of the trans-Alaska oil pipeline in which, or during which there was a semblance of some type of joint Federal program, where you had a designated Federal agency that had oversight responsibility, and you had a State agency that had overall oversight responsibility.

The same thing with the pre-construction phase of the Alaskan Northwest Natural Gas Transportation System, where you have a special Federal office, the Office of Federal Inspector, that had designated primary goals established.

I found them to be very, very effective in actually dealing with mitigative type issues, resolving problems, implementing them and enforcing them.

The CHAIRMAN. You might give us either legislative language or more specific advice on that. We would welcome your comments in writing on how we could accommodate the legislation to do that. Senator McClure?

Senator MCCLURE. Thank you very much, Mr. Chairman. Thank you, gentlemen.

Mr. Sanderson, I know it is always a little more difficult to comment on somebody else's words than it is on your own, and I notice that you have that difficulty here because the June 1st letter was written by the Seattle field office and signed by Robie Russell, the Regional Administrator.

And yet I am going to ask you to comment on some of the language, and I assume you are familiar with that June 1st letter and the attachments to it.

Mr. SANDERSON. Yes, sir.

Senator MCCLURE. First, let me preface it by a question. This is not to beat up on EPA, and I do not want it to be understood that way.

But does EPA have a positive mandate, or is it just a negative one?

Mr. SANDERSON. We have a positive mandate.

Senator MCCLURE. So you do have a mandate to come up with answers, not just to come up with questions?

Mr. SANDERSON. We have a positive mandate to comment on the extent and magnitude of adverse impacts described in environmental impact statements, as prepared by the other agencies. That is correct.

Senator MCCLURE. But you are not there just to stop people from doing bad things?

Mr. SANDERSON. Certainly not. But at the same time we are there to raise the issue so that competent authorities in any area can take a look at what the issue might be.

Senator MCCLURE. But are you there also to assist seeing that the agencies do things right?

Mr. **Sanderson**. Certainly.

Senator **McClure**. So it is not just to raise the question and say, no, now you go find the answers. You have a positive mandate, as well, to find some answers.

Mr. **Sanderson**. We would hope so.

Senator **McClure**. Well, we would all hope so. The question is whether you do it.

And I guess that is where you get into the beat up on EPA questions around this place, when we sometimes think you are much better coming up with questions than you are coming up with answers.

Of course, we do it up here too. I could not help but notice, Senator Bumpers was faithful to one prediction, he asked the question and then he went to lunch. Some think some of you went to lunch before he asked the question.

But I do not. I am not approaching it in that vein at this time. I just wanted to note that indeed, for instance, as Senator Bumpers was criticizing the amount of money that is going into various programs. I thought Secretary Horn lost a good opportunity for a good answer to each one of those.

Each one of those levels was set by Congress. A majority of Members of the Congress voted for those levels, and we have got some tough choices to make up here on budgetary questions.

But you can not just beat up on the administration on questions like that, and I do not mean to beat up on the administration today. Because we did share in each of those decisions and we share with you in the decisions you would make.

But I note that Mr. Russell in his statement, and on page two of the June 1st letter, the very first point he makes in the itemized list of complaints that he makes.

In particular, we do not believe it appropriate to suggest that the Prudhoe Bay experience would be duplicated in ANWR, and therefore, we should not depend upon the experience at ANWR.

Then I look at the attachments to that letter, and in the first specified statement there is, "Available knowledge or air quality at the Prudhoe Bay development was not utilized."

You see, EPA had it both ways. You cannot depend upon Prudhoe, but you did not depend enough upon Prudhoe. So, in this process, where do you participate as a positive rather than a negative commentator?

Mr. **Sanderson**. Senator, in the days since Mr. Russell's letter was received by Mr. Horn, my office, along with the people from Seattle, have met several times with the Assistant Secretary, with his people, to try to determine what it is that we can do.

And I think the effort that the Secretary made today, particularly in incorporating the NEPA process and bringing their views back in are, in large measure, an understanding of what both Agencies' roles are, what we were interested in, what he could do to meet those interests, and what the issues might be. I do believe it has been a positive, iterative process.

Senator **McClure**. And as a result of that, are you positive about the administration's position of going forward on ANWR?

Mr. **Sanderson**. Again, the administration has made its decision. EPA has never opposed that position.

What we have said, that if it is done, it has to be done in an environmentally sound fashion.

Senator McClure. So you do support the decision that has been made to go forward and believe it can be done in an environmentally sound fashion?

Mr. Sanderson. I think that the steps outlined by Mr. Horn and the discussion that we have had will lead to an environmentally sound fashion in this whole effort. Yes, sir.

Senator McClure. I might ask the same question of the three gentlemen from Alaska. I have read your statements, and they are very good statements, and I appreciate the work that went into producing them.

They are a part of the record and they will be a very great help to us as we try to move forward, not only in the legislation, but in the formulation of the legislative history, and hopefully we will be in the phase of making sure it is done the way we hoped it would be done at the end of that process.

Do each of you believe we can move forward on this? And do you support the decision to go forward on ANWR? Or, are you just commenting about something you would rather did not happen?

You represent different agencies of the same State government. I assume the State government has a position, and you are all here to support that position. Am I correct?

Dr. Ott. That is correct.

Senator McClure. And what is that decision by the State government? To go forward with the concerns you have suggested?

Dr. Ott. The State of Alaska fully supports the opening of the ANWR area to oil and gas leasing, including exploration and development, with several exceptions.

One exception are the spring water areas in the 1002 zone. I believe there are two of those documented in addition to the special spring area. And with the exception of the core calving area of the Porcupine Caribou Herd, as defined in the draft 1002 report, in terms of its geographic extent.

In addition to that, though, we are more than willing, and it is so stated in the record, willing to work with the Committee to try to approach any other types of alternatives that may be available for addressing the issue of the Porcupine Caribou Herd, specifically the core calving area.

Senator McClure. Any other comments from either of you other two gentlemen?

Mr. Van Dyke. I would like to clarify the record. There was a question asked of Mr. Horn on rehabilitation responsibilities at Prudhoe Bay.

The lessees there, the oil companies have signed contracts with the state, and those contracts include a provision that they are responsible to rehabilitate those drill sites and roads. So it is an existing contractual obligation.

Senator McClure. I note that a lot of this we are still in the midst of, with respect to Prudhoe Bay, even though it is a relatively mature operation at this point.

Nevertheless, we still have some experience in dealing with problems that we encountered, and will continue to encounter, including rehabilitation.

I notice also, Dr. Ott, that you make a statement in your prepared testimony with respect to the use of gravel sites for water impoundments that may have net beneficial effects on certain selected species of fish and water fowl.

But you also caution that we have not yet had enough experience to know whether that promise will be realized. Am I correct in summarizing that?

Dr. OTT. Actually, the Fish and Wildlife Service sponsored a 5-year study over 10 years ago that looked at gravel pits and the possibilities for rehab restoration, in terms of fish and wildlife resources. And there is no question in my mind that you can do something with these gravel sites.

The issue in Prudhoe Bay is the fact that we have 15 or 16 of these large sites. We only recently have the first one partially rehabbed, and we have not acquired the data specific to that environment in those types of sites.

There is nothing else in the Coastal Plain and the Prudhoe Bay-Kuparuk area that resembles the water reservoirs in terms of depth and size. Most of the lakes are very shallow.

These are reservoirs, mined-out gravel sites up to 100 acres in size, and 50 to 60 feet deep. And no one has the data to really explain how they may operate and function and what benefits. But I have no question you can do it.

Senator MCCLURE. You can speculate about where they may go, and that may be informed speculation.

Dr. OTT. At this time we have also initiated a program two years ago, based in part on monies provided through the Coastal Zone Management Program, to gather some of that initial data on fish, water quality, et cetera.

Senator MCCLURE. Mr. Van Dyke, I wonder if you could provide for the committee's records copies of relevant rehabilitation contracts that the oil companies have entered into.

Mr. VAN DYKE. Yes, I can do that.

Senator MCCLURE. Thank you very much. Mr. Chairman, I have no further questions.

The CHAIRMAN. Before I call on Senator Murkowski, I am going to have to leave at this time, and ask my colleagues to stay as long as they wish, as long as the witnesses will stay or are able to stay.

I want to reiterate to all of those in the audience who may be testifying in the future, or others who have interest in this matter, I guess all of you do, to please advise our staff as to the principal issues that you see, if we have not mentioned those, because we want to begin the process of trying to identify and refine and define the extent of these issues as we go along.

So with that, I want to thank this panel very much for excellent testimony, as well as Secretary Horn earlier. And I recognize Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman. Mr. Sanderson, I wonder if you could explain how EPA views its role in insuring environmental compliance in ANWR, as a partner with the state?

And this question has come up with the State witnesses, who have already testified their interest in mandating a Federal-State cooperative scenario. Do you see the relationship as a partner with the State, or in some other capacity?

My concern is, would this capacity mandate, you might say, a directive that would prevail, as opposed to an equal partnership of State-Federal oversight on the environmental concerns?

Mr. **Sanderson**. Senator, we would not. We would work with the State of Alaska, as we have with the State of Alaska on Prudhoe, as we have on every other delegated and workable program.

It would depend on which programs are relevant, which the State has responsibilities for, and which EPA has retained the responsibilities for.

Senator **Murkowski**. All right. In other words, the compliance would have to be to your standard.

Mr. **Sanderson**. It would be working with the State to our standards. That is correct.

Senator **Murkowski**. To your standards. So you would mandate the compliance for the State, in effect.

Mr. **Sanderson**. That is correct.

Senator **Murkowski**. But they would have an opportunity to consult then with you and make their concerns known.

In other words, it would not be a region 10 scenario out of Seattle, with experts that travel up once in a while and familiarize themselves with the situation, and then go back. The Alaskans that are charged with responsibility of maintaining the environmental oversight would have input?

Mr. **Sanderson**. It would be in close cooperation with the State officials in Alaska.

Senator **Murkowski**. I assume you would be open to negotiate the terms of the agreement so the State would, in effect, have a reasonable opportunity to have its input, not only included, but not just necessarily excluded if we reached an impasse where somebody said, well, this is the way it is going to be and that is it.

Mr. **Sanderson**. I do not foresee any unilateral harsh actions that might be taken. I do not think so.

Senator **Murkowski**. Well, perhaps we are a little sensitive to that in Alaska, where Federal dictates and decisions by individuals that do not have an awful lot of familiarity but have an honorable intention.

And they just do not know the facts and circumstances. And oftentimes if we could have an opportunity to at least present our case, we are heard. And I do not mean to belabor the point.

But there was a State-Federal role that was appropriate in the Prudhoe Bay development and the pipeline, and it was necessary and it was worthwhile. But it was also expensive.

I do not know if we can attribute a dollar amount, but when a project is estimated to come in at roughly $1 billion and comes in at about $7 billion to $8 billion, there are those that would suggest that a lot of that additional cost, while necessary to ensure the safeguards, was perhaps redundant and so forth.

And I would hope that we could learn something from the experience in Prudhoe Bay, even though there are those that suggest the situation is substantially different, that the caribou are different. My Eskimo friends continue to say, they taste the same. But I am not going to belabor that point.

I am interested particularly in the position of the state, because I believe that this is the summary of the state's testimony, which we have heard today. And I guess Mr. Ott, the responsibility of interpreting the State's position on the core calving area perhaps falls to you.

I note we do not have any biologist or those that were involved in putting the State's report together. Is that a fair assessment?

Dr. OTT. No. I was directly involved in putting the State position together.

Senator MURKOWSKI. Well, I would like to walk through briefly, if it can be done briefly, the position of the State.

We had the governor here earlier this year. And he testified as to the existence of the core calving area, but was not specific in identifying the area. I believe since that time there has been an area designated that. You can correct me, but is it around 243,000——

Dr. OTT. It is 242,000 acres.

Senator MURKOWSKI. Okay. And this is an area of the Jago River, and as a consequence of the identification of the area and the experience last year of the caribou migration, which I gather much of the calving was not done in Alaska, not done in the Jago area, but in fact on the Canadian side.

Dr. OTT. Again, I am not the individual game biologist that has the responsibility for the Porcupine Caribou Herd.

But even this year there was a substantial amount of calving in the general area of the core calving area in the 1002 area.

Senator MURKOWSKI. All right. We need to have, and I would ask for the record your permission, Mr. Chairman, for the State to put into this record their evaluation of the calving that occurred this year and how much of it was in the area that you are indicating is the 243,000 acres in the Jago River that you have indicated you are sensitive to.

Now, is it my understanding further that it is the State's position that there be a 7-year exception given on that, so you can evaluate the impact of calving in the area for the next 7 years?

Dr. OTT. That is correct.

Senator MURKOWSKI. And can you tell us what you intend to do during that 7 years?

Dr. OTT. I can briefly summarize. I think it has about three or four major goals, one of which is to go and to look specifically at the core calving area, to characterize it, in terms of its physical and biological characteristics, in comparison with adjacent areas not within the core calving area.

Senator MURKOWSKI. So you will compare it with the adjacent area, which would be perhaps Prudhoe Bay.

Dr. OTT. Not the Prudhoe Bay area. The critical area is within the calving grounds of the Porcupine Caribou Herd.

And in addition, you would look at predators and various other aspects. But it would be concentrated in looking at the core calving area versus peripheral areas, areas that are also used by the Porcupine Caribou Herd for calving.

At the same time, we would continue the work that we are currently doing in Kuparuk-Prudhoe Bay.

Senator MURKOWSKI. Tell me how you do this. This area, obviously, has been under some consideration, and there seems to be differing opinions as to how much of the caribou herd actually calves in the area, how much displacement would be associated with the female caribou as they go into calve by activity.

Have we got in the State of Alaska a reasonable amount of data to draw conclusions on what activity does to the calving patterns of the caribou?

Dr. OTT. The best data source that we have is the 4-year pre-construction, 4-year post-construction data gathering effort by Dr. Cameron the Milne Point pipeline, which clearly shows a displacement of cows during calving, from the Milne Point road and pipeline.

That displacement occurred during both years of high activity, the construction phase of building the road, and also during low periods of activity.

Senator MURKOWSKI. What is the history of the increase or decrease in that herd?

Dr. OTT. The Central Arctic Herd over the past decade has tripled in size.

Senator MURKOWSKI. That is the herd associated——

Dr. OTT. With the Milne Point pipeline.

Senator MURKOWSKI. For the record, the Milne Point is adjacent to the general Prudhoe Bay area?

Dr. OTT. Correct. It is between Prudhoe Bay and Kuparuk.

Senator MURKOWSKI. So, while it is conceded that there was a displacement, that means, I assume, in layman's language, they were ordinarily over here, and as a consequence of the activity moved over here, and they calved. Is that correct?

Dr. OTT. That is correct.

Senator MURKOWSKI. Is there any indication that there was a loss of calves as a consequence of the displacement?

Dr. OTT. At this point in time, with respect to the Central Arctic Herd, there has been no direct tie between the development that has occurred and a population level——

Senator MURKOWSKI. No direct tie. That means one could say, no detrimental effect on the——

Dr. OTT. One probably not say that, because again——

Senator MURKOWSKI. Well, you say that there has been a substantial increase in the population.

Dr. OTT. Correct.

Senator MURKOWSKI. Okay.

Dr. OTT. What I am saying, though, is that the long-term effects of this development activity, what has occurred to date, the changes that have occurred only since, well, in the last 10 years within Prudhoe Bay-Kuparuk, and changes in the future, the end product, the long-term effect on that herd may not be known for another 15 or 20 years.

In addition, there has been a lot of mitigative measures implemented in the newer field such as Kuparuk and Endicott. And the overall effectiveness of some of these measures may be offsetting any of the potential detrimental effects.

Senator MURKOWSKI. What is a detrimental effect? I assume that you, the Department of Fish and Game, observes the Milne Point situation for 4 years and watches the caribou come in and determines whether they are displaced and determines whether as a consequence of the development there is a resultant loss of calves.

Dr. OTT. I shortened up my talk. But in the first part, originally what I was going to discuss is how the Department does define an impact.

And we really have three different ways of doing it. There are three different things that we look at. One is the direct effect on the habitat. You take a wetland and you cover it with gravel, that is an impact.

The second one is the use of the habitat. In this case, Milne Point, and displacement of animals.

The third one is the population level effect. When we look at projects and review them, we concentrate our efforts on habitat and the use of the habitat, because quite often trying to look at population levels will not give you a clear picture of what may be happening over the long term, or what may be happening from a cumulative standpoint from a series of developments.

There have been a lot of factors that favored the growth of the Central Arctic Herd over the past few years. One has been the removal of predators following completion of the trans-Alaska pipeline, and good climatic conditions, and very low hunting.

Senator MURKOWSKI. Obviously, there is a great sensitivity to this, and there should be. But there is going to have to be decisions made.

And what we need to know is whether the trends associated with the Central Arctic Herd near Prudhoe Bay, the realization that there is a reduction in predator activity, obviously there is an immediate increase in the herd.

The application of new technology, which seems to be the design of the industry with regard to the ANWR, where we are aware that the footprint potentially, if indeed there are substantial recoverable reserves there, will be much less proportionally than ANWR, still leaves us with the unknown question of what the disruptive long-term applications will be.

But again, if through advanced technology the footprint is less, I assume it is fair to say that the danger is less. Is that a fair statement?

Dr. OTT. In the work that we have done, and in the attempts, and I am going to refer back to some of the discussions I have had with the game biologists, we tried to interpret the results that we have learned from the Central Arctic Herd, because that is where we do have development, to the Porcupine Caribou Herd.

But there are some major differences between those herds. And we are not, at this time, convinced that, for example, a group of 80,000 animals, when they encounter a pipeline and a road, will cross it.

We have never experienced that type of event. You could not experience it in the Central Arctic Herd. But we do know for a fact——

Senator MURKOWSKI. You say they will cross it?

Dr. OTT. We do not know whether they will or will not.

Senator MURKOWSKI. Well, you know they cross the Dempster Highway.

Dr. OTT. Road and pipeline with traffic? There is no pipeline on the Dempster Highway.

Senator MURKOWSKI. No. There is a highway, though, with traffic.

Dr. OTT. Right.

Senator MURKOWSKI. And we know what they do with the trans-Alaska pipeline, the Central Arctic Herd, they walk under it, they walk over it, they are on the road. Right?

Dr. OTT. That is correct.

Senator MURKOWSKI. So what is the grave doubt then, if they cross the Dempster Highway, the Porcupine Caribou Herd, and if the Central Arctic Herd wanders all over the pipeline, over and under it, that the Porcupine Herd will not walk under or over a pipeline, if it is ever built?

Dr. OTT. We have no way of predicting, and I will say it again, what 80,000 animals will do in one group moving along the coast, if they encounter the types of development activities and facilities that you see in the Prudhoe Bay-Kuparuk.

We are not talking about——

Senator MURKOWSKI. This brings me to my point. You are talking about taking 240,000 and some odd acres, and studying them for 7 years.

Now, if you are going to study them, what are you going to do to satisfy yourself that they will cross over, they will not cross over? Do you propose a specific creation of a facsimile?

Dr. OTT. I think we kind of skipped a step there. First, I thought you were, we went back to the core calving area, indeed, with respect to trying to get animals across the facilities.

In the State's position, we have already acknowledged that that has to be done. And the mitigation is going to have to be developed.

Senator MURKOWSKI. Excuse me, I was distracted. I would appreciate if you would go back and make your point again.

Dr. OTT. In terms of designing in to whatever, ultimately whatever decision is made, and if indeed there is development in the 1002 area, we have already made the commitment that we are going to have to figure out how to pass that large group of animals.

Because the State's position is not one, we are supporting leasing of the majority of the area, with the exception of the core calving area. And those animal movements, a lot of those occur along the coast, which are areas that potentially could be developed.

All I was doing was pointing out that there are differences between the two herds in terms of size, in terms of the areas that they use, in terms of the alternative habitats that they may have available.

Senator MURKOWSKI. I guess to get back to the question of the calving area, how do you propose to study this to make a determination whether the female caribou will be displaced by studying for 7 years an area of 243,000 acres?

Dr. OTT. We already know that they will be displaced as a result of the activities.

Senator MURKOWSKI. How do you know that?

Dr. OTT. We know that based on the data that has been obtained in the Prudhoe Bay area.

Senator MURKOWSKI. Do you know, for example, what, on the 243,000 acres, if you laid it out in sections, how many caribou have calved on one section vis-a-vis another section, vis-a-vis outside the 243,000 acres?

Do you have some historical evidence to know what occurred there over the last 6, 7, or 8 years on individual areas, that the next year they might not wander over to another area?

I mean, you have got a large, large area there. And to withhold for 7 years to study it would seem to mandate that you almost had to set up some facsimiles.

What I am trying to get at, is this part of the plan, to put up some pipeline for a ways, an oil rig, something that would depict what would occur in the leased areas, so we can see if indeed this is going to be a factor in the caribou not going in there?

Dr. OTT. The actual details of the research program, our cooperative effort between the Department and the Fish and Wildlife Service, in those details I really do not know.

Senator MURKOWSKI. Well, we are going to ask the State in the record to provide us with some of the more detailed information of how they propose to go about this study, because it is important as we consider leasing if we are going to leave an area out for good reason, why then that affects consideration of what is the potential value of that are from the standpoint of competitive bidding.

I do not know, but it evidently seems to be attractive to some, to have some detail as to how you propose the study. And if you are going to use a facsimile, is not Prudhoe Bay a facsimile, and will that be a consideration as well?

Another question, there was a study that was presented before the committee, Dr. Bergerub, I believe, is close reference to the pronunciation. He was a biologist, eminent in caribou, I think, with the University of Victoria. I think he has studied them some 22 years.

His assessment seems to substantially contrast from the State's general position, and I assume you have had an opportunity to examine that particular paper that he has done.

Dr. OTT. I have not specifically done that. No, sir.

Senator MURKOWSKI. We would be happy to provide it, if you do not have access to it, because it was rather revealing, suggesting indeed that the caribou was very easily displaced to just move over to whatever was around that it did not like, and if there was a predator around, why then that was obviously a very real threat.

But that the reason the progress of the caribou in their migration was not that all the caribou stayed together, but the males stayed closer to the foothills where the feed was, but that was where the predators were, and the reason the females went out on the Coastal Plain was to calve in an area where there virtually are no predators.

We would appreciate an evaluation of that study, because it is used to basically indicate that the caribou are very easily displaced.

Dr. OTT. Could I have the specific reference to the study you are referring to?

Senator MURKOWSKI. Tom will give you the study. We have got it.

I have got several other questions for the witnesses, Mr. Chairman. But I think in the interests of time, and they have been very patient, I think I will submit them.

I want to thank you, gentlemen, and the Environmental Protection Agency, for your detailed written testimony, and our assurance that, despite some of the lead time that was outlined today, I think my colleagues, for the most part, are anxious to proceed in addressing this issue as far as the role of this committee. And your contribution is most significant.

And I am deeply grateful for those of you who came down from Alaska. I too came down from Alaska and walked right into this hearing.

Senator McClure. Thank you very much, Senator. The committee will meet again tomorrow at 9:30 a.m. The committee now stands adjourned.

[Whereupon, at 12:52 p.m., the hearing was recessed, to reconvene Wednesday, October 14, 1987.]

ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987

WEDNESDAY, OCTOBER 14, 1987

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:45 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The CHAIRMAN. Good morning. This morning we continue our hearing on S. 1217, a bill to authorize oil and gas leasing production and development in the Coastal Plain of the Arctic National Wildlife Refuge.

We begin this morning with a panel composed of Thomas Cook, Exploration Representative from Alaska Chevron, U.S.A., Roger Herrera, Manager of Exploration and Lands from Standard, James D. Weeks, Manager of the Prudhoe Bay Field Operations with Arco, and Raymond L. LaGarde, Director of Industry and Regulatory Affairs with Conoco.

Gentlemen, welcome. If the panel will please come forward. I understand Senator Nickles has an opening statement.

STATEMENT OF HON. DON NICKLES, A U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator NICKLES. Thank you very much. I apologize, I missed the hearing yesterday. I was out of town, and it was impossible to be here.

But I want to thank you and commend you for having this hearing and the several other hearings that we have had on the ANWR issue. I think it is most important that we move forward as quickly as possible.

I think it would be a tragic mistake for this country, for our national security, and for energy security, for us not to move forward in development and production in the ANWR area.

As the Chairman is well aware, I had the pleasure of accompanying him and other Members of the Committee to the ANWR area and to the Prudhoe Bay area. It reconfirmed my thoughts that it would be a tragic mistake for us not to move forward as quickly as possible.

I think without any doubt the Prudhoe Bay area has proved that production can move forward in an environmentally safe manner. Certainly we could move forward in an environmentally safe manner in ANWR as well. So, Mr. Chairman, I commend you in moving forward.

A couple of things have changed since we had the hearings several months ago. Our energy dependence has risen. Our gross imports are now up to 42 percent. We are marching rapidly towards that 50 percent mark that I predicted would be reached by 1990.

I still think it will be the case, even if we have development of ANWR, that we will be importing 60 some percent by the year 1995. So I think it is incumbent upon ourselves to do what we can to ensure domestic production from safe and secure resources. Certainly this is the case in Alaska.

Not to mention the fact that we see now with the Prudhoe Bay area supplying about 24 percent of the domestic production, that production will decline and decline rather rapidly.

Altogether in the Prudhoe Bay area, we are producing about two million barrels per day. That will decline. I think it is estimated to decline by the year 2000, and that will decline to about 600,000 barrels per day.

That is a decline of 1.4 million barrels that have to be made up, and I would hope and think that it could be made up in the ANWR area. We will not know unless we move forward with this project.

So again, I commend you, and I comment Senator Murkowski for his legislation. I would like to ask our panelists if they have some comments on Senator Murkowski's legislation, and if they have ideas on how it might be improved. I think myself and other Members would be quite willing to listen.

Again, I would repeat my earlier comments. I have no qualms that we can move forward in a manner that would both allow exploration and production in the ANWR area, and do it in an environmentally safe manner.

Again, if there are some improvements that should be made in the legislation, I would like to hear those recommendations. And I thank the Chairman.

[A statement for the record from Senator McClure follows:]

STATEMENT
SENATOR JAMES A. McCLURE
HEARING ON S. 1217
OCTOBER 14, 1987

On November 4, the Office of Technological Assessment will hold a workshop in Anchorage, Alaska. The purposes of the workshop will be (1) to explore the status of technologies for Arctic oil and gas exploration and production that may be used in ANWR if such activities are permitted; (2) to discuss technologies and practices that have been developed in the past 15 years of Alaskan oil production and to explore new technologies that are needed or likely to be developed for future Arctic oil production; and (3) to review the status of technologies which have significant impacts associated with their use.

OTA will invite a group of participants who have special or expert knowledge of one or more significant aspects of Arctic oil and gas technologies. The group will include persons from diverse interests as much as possible. The group will be mainly Alaskan-based; another workshop is planned in the lower 48.

OTA has developed a list of questions that I think will help our deliberations, and we need to get a head start on the issues raised. I would ask all witnesses to provide input. Many questions have been partially addressed in testimony during prior hearings.

The questions are:

Attachment 1

Arctic Oil and Gas Technology--Workshop Questions

1. Which of the major oil and gas technologies for the Arctic are significantly different from that used in temperate climates/regions?

2. What major technologies required significant research and development for use in Prudhoe Bay when it was built?

3. What are the best examples of Arctic "state-of-the-art" technologies for each of the categories in the OTA table?

4. What major technologies are new developments in 1987 and were not available when Prudhoe was developed in the mid 1970s?

5. What are the major needs for developing new technologies for future exploration and production in ANWR?

6. What technologies are now under development and may be available (when?) for future use in ANWR?

7. What numbers, sizes and configurations of gravel pads for wells, facilities, pipelines, roads, airstrips, marine docks, etc. would be most likely for ANWR development? How do each compare with Prudhoe? Kuparak? Endicott? Are the EIS estimates of gravel requirements reasonable? What are the determining factors in selecting designs for gravel pads?

8. What drilling muds and mud systems would be most likely to be used in ANWR? What factors determine industry's selection of mud system designs?

9. What estimates of fresh water needs and sources are available for ANWR operations--exploration through production? What techniques are planned for developing water supplies and where have these been used?

10. What is the current status of directional drilling technology? What developments may be available in the next 10 years? Where are the best examples of state-of-the-art directional drilling? What factors affect the selection of well spacing and clustering designs in specific field development designs?

11. What is the status of well design technology to counter problems of permafrost melting and ground subsidence?

12. What is the status of Arctic pipeline design and construction technology? What examples of pipelining would be most likely for ANWR development? What factors affect selection of winter-only construction practice?

13. What technological changes or improvements may be applied to ANWR that would significantly improve economics of oil production there?

14. What specific facilities and equipment may be unnecessary to provide for ANWR development because they are available and useable at Prudhoe?

15. Are there any special characteristics of ANWR (compared to Prudhoe), that would markedly affect selection of technologies and systems for exploration, development and production?

16. What technologies are under development or now available to improve recovery from any Arctic oil field? Where and how may these be applied in the Alaskan North Slope?

17. Of the mitigation measures recommended in the EIS (see attachment 2), which are practicers with economic impacts, and which would require technology improvements?

The CHAIRMAN. Gentlemen, welcome to the panel.

We would like for you to put your, in fact we will put all of the written statements into the record at this time, as if read in full, and will be read. And we would appreciate it if you would give us your advice.

You have got the issue list there. We would like to focus on the those matters that really concern the Committee. Not that this is an exclusive list, but certainly this list of issues will be important to us, and we would like your input on those, or whatever other issues you feel are important.

If you have not otherwise decided who will go first, then we will recognize Thomas Cook of Chevron.

Mr. COOK. Mr. Chairman, we had planned to have Mr. LaGarde go first, if that is agreeable.

The CHAIRMAN. That is just fine.

STATEMENT OF RAYMOND L. LaGARDE, DIRECTOR, INDUSTRY AND REGULATORY AFFAIRS, NORTH AMERICAN EXPLORATION DEPARTMENT, CONOCO, INC.

Mr. LAGARDE. Thank you, Mr. Chairman. I am Raymond L. LaGarde, Director of Industry and Regulatory Affairs for the North American Exploration Department of Conoco, Inc., the DuPont Company.

Following my remarks on an appropriate leasing system for the Coastal Plain of the Arctic National Wildlife Refuge, which I will also refer to as the 1002 area, they will be describing a likely timetable and techniques for exploring the 1002 area, and an example of development scenarios for the two Coastal Plain prospects.

It is our hope that the 1002 area will be open soon to oil and gas development. And if this comes to pass in the establishment of an effective and efficient leasing program, it will be necessary to begin the process.

I suggest that a leasing system should achieve the following goals. First, encouragement of the early exploration and development of the 1002 area's oil resources to meet the Nation's need for secure oil supplies.

Second, the protection of environmental values.

Third, the receipt of a fair and reasonable right return to the Federal government for leasing rights. Those are pretty basic goals to meet.

And to accomplish those goals, we have three basic concepts that we think ought to be in the leasing process. First, making the entire 1002 area available to leasing from the beginning, without introducing concepts of phasing or withdrawals.

Second, the use of a competitive lease sale held in adherence to a predictable, dependable leasing schedule. And third, the issuance of leases which grant the right to explore and develop oil and gas resources, so that those rights would not be limited.

These goals and basic concepts outline the structure of the system Conoco would propose, and we believe that Senate bill 1217 meets these criteria.

Rather than go into the text any further, I think we would be happy to entertain any questions or go into any particular issue that you would like to at this time.

[The prepared statement of Mr. LaGarde follows:]

STATEMENT OF RAYMOND L. LAGARDE
ON BEHALF OF CONOCO, INC.
BEFORE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES HOUSE OF SENATE
HEARING ON THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE

OCTOBER 14, 1987
WASHINGTON, D.C.

MR. CHAIRMAN, SENATORS, I AM PLEASED TO APPEAR BEFORE YOU TODAY. MY NAME IS RAYMOND L. LAGARDE. I AM DIRECTOR OF INDUSTRY AND REGULATORY AFFAIRS FOR THE NORTH AMERICAN EXPLORATION DEPARTMENT OF CONOCO, INC., A SUBSIDIARY OF THE DU PONT COMPANY.

APPEARING WITH ME TODAY ARE MR. JIM WEEKS, MANAGER OF PRUDHOE BAY FIELD OPERATIONS FOR ARCO ALASKA, INC., MR. THOMAS COOK, EXPLORATION REPRESENTATIVE FOR CHEVRON U.S.A., INC., AND MR. ROGER HERRERA, MANAGER, EXPLORATION AND LANDS, WITH STANDARD ALASKA PRODUCTION COMPANY.

FOLLOWING MY REMARKS ON AN APPROPRIATE LEASING SYSTEM FOR THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE, WHICH I ALSO WILL REFER TO AS THE 1002 AREA, THEY WILL BE DESCRIBING A LIKELY TIMETABLE AND TECHNIQUES FOR EXPLORING THE 1002 AREA, AND AN EXAMPLE OF DEVELOPMENT SCENARIOS FOR TWO COASTAL PLAIN PROSPECTS.

IT IS OUR HOPE THAT THE 1002 AREA WILL BE OPENED SOON TO OIL AND GAS EXPLORATION AND DEVELOPMENT. IF THIS COMES TO PASS, THEN THE

ESTABLISHMENT OF AN EFFECTIVE AND EFFICIENT LEASING PROGRAM WILL BE NECESSARY TO BEGIN THE PROCESS.

I SUGGEST THAT SUCH A LEASING SYSTEM SHOULD ACHIEVE THE FOLLOWING GOALS:

1. ENCOURAGEMENT OF THE EARLY EXPLORATION AND DEVELOPMENT OF THE 1002 AREA'S OIL AND RESOURCES TO MEET THE NATION'S NEED FOR SECURE OIL SUPPLIES.

2. THE PROTECTION OF ENVIRONMENTAL VALUES.

3. THE RECEIPT OF A FAIR AND REASONABLE RETURN TO THE FEDERAL GOVERNMENT FOR LEASING RIGHTS.

TO ACCOMPLISH THESE GOALS, WE RECOMMEND THE INCORPORATION OF THREE BASIC CONCEPTS INTO THE LEASING SYSTEM:

1. MAKING THE ENTIRE 1002 AREA AVAILABLE TO LEASING FROM THE BEGINNING WITHOUT PARTIAL WITHDRAWALS OR PHASED LEASING.

2. USE OF COMPETITIVE LEASE SALES HELD IN ADHERENCE TO A PREDICTABLE, DEPENDABLE ANNUAL LEASING SCHEDULE.

3. THE ISSUANCE OF LEASES WHICH GRANT THE RIGHT TO BOTH EXPLORE FOR AND DEVELOP OIL AND GAS RESOURCES.

THESE GOALS AND BASIC CONCEPTS OUTLINE THE STRUCTURE OF THE SYSTEM CONOCO WOULD PROPOSE. WE BELIEVE THAT S.1217 MEETS THESE CRITERIA. I WOULD LIKE TO ELABORATE BRIEFLY ON WHY THIS STRUCTURE SEEMS THE MOST APPROPRIATE TO US.

FIRST, WE URGE THAT THE ENTIRE COASTAL PLAIN BE OFFERED FOR LEASE IN EACH LEASE SALE FOR SEVERAL REASONS.

A. WE ARE CONVINCED THAT THIS WILL PROVIDE FOR THE MOST SYSTEMATIC AND EFFECTIVE EXPLORATION AND DEVELOPMENT IN THE MOST TIMELY MANNER.

B. IT WILL TEND TO PROMOTE IMPROVED PLANNING AND ALLOW FOR THE EARLIEST CONTRIBUTION OF NEW RESERVES TO THE DOMESTIC MARKET. THIS WOULD ALLOW INDUSTRY TO MORE EFFICIENTLY USE THE CAPITAL NECESSARY FOR DEVELOPMENT AND AS A RESULT, LOWER THE COST OF THE PRODUCT TO THE CONSUMER OVER THE LONG TERM.

C. FULL LEASING OF THE 1002 AREA WOULD GIVE THE GOVERNMENT A REALISTIC INVENTORY OF ITS RESERVES WHICH GIVES GOVERNMENT IMPORTANT INFORMATION NEEDED NOW FOR BETTER ASSESSMENT OF THE ECONOMIC AND STRATEGIC IMPLICATIONS OF THE ACTUAL DOMESTIC ENERGY SUPPLY SITUATION.

D. IT WILL SIMPLIFY GOVERNMENTAL ADMINISTRATION OF THE LEASING PROGRAM, SAVING EFFORT AND TAX REVENUES FOR

OTHER PURPOSES, AND PROVIDING ROYALTY PAYMENTS TO THE GOVERNMENT SOONER.

E. CONGRESS HAS ALREADY WITHDRAWN 19 MILLION ACRES OF ADJACENT REFUGE LANDS FROM CONSIDERATION FOR OIL AND GAS LEASING, INCUDING A WILDERNESS AREA THAT EXTENDS ALONG THE COAST ADJACENT TO THE 1002 AREA, ALL THE WAY TO THE CANADIAN BORDER.

OUR SECOND CONCEPT CALLED FOR LEASING ON A TIME CERTAIN, REGULAR SCHEDULE. THE ADHERENCE TO A LEASING SCHEDULE WHICH IS DEPENDABLE AND PREDICTABLE ALLOWS THE PUBLIC, FEDERAL AND STATE GOVERNMENTS, AND INDUSTRY TO PLAN EFFECTIVELY FOR THE EFFORT AND TO SECURE BUDGETS NECESSARY FOR PREPARATION AND PARTICIPATION IN COMPETITIVE LEASE SALES.

THE CONCEPT THAT THE 1002 LEASING SYSTEM MUST ENSURE THAT ALL PHASES OF PETROLEUM ACTIVITIES CAN BE UNDERTAKEN PURSUANT TO ANY LEASE ISSUED IN THE 1002 LEASING SYSTEM WAS THE THIRD KEY IDEA I MENTIONED PREVIOUSLY. TO ENACT PROPOSALS TO ALLOW EXPLORATION TO PROCEED WITHOUT THE ATTENDANT DEVELOPMENT RIGHTS WOULD BE A MISTAKE. THE RIGHT TO EXPLORE, SEPARATE FROM DEVELOPMENT, IS OF LITTLE VALUE TO INDUSTRY. I SUGGEST THAT IT IS TODAY, AS IT HAS BEEN IN THE PAST, BETTER PUBLIC POLICY TO ALLOW INDUSTRY TO TAKE THE RISK THAT THE PROSPECT WILL BE DRY IN EXCHANGE FOR THE RIGHT TO SHARE IN THE REWARDS FOR TAKING THE RISK, THAN TO STRUCTURE A LEASING PROGRAM WHERE THE GOVERNMENT BEARS THIS ENTREPRENEURAL RISK. INDUSTRY IS WILLING TO BEAR THIS RISK WITH SOME CERTAINTY

THAT IT WILL SHARE IN THE REWARDS ASSOCIATED WITH RISK TAKING. THE PRIVATE SECTOR REMAINS THE PROPER PLACE FOR THIS RISK TO BE BORNE.

WE DISAGREE WITH THOSE WHO CALL FOR IMPOSING "PHASED" LEASING ON THE 1002 LEASING PLAN. PHASING SIMPLY IS ANOTHER WORD FOR DELAY. DELAY IN THIS CASE MEANS SLOWER EVALUATION OF 1002 RESERVES, LESS EFFICIENT DEVELOPMENT OF THE PROVINCE AS A WHOLE AND DIMINISHED VALUE TO THE CONSUMER AND THE FEDERAL TREASURY.

MOST OF THE OPPOSITION TO OPENING THE 1002 AREA TO OIL AND GAS DEVELOPMENT HAS BEEN ROOTED IN CONCERNS OVER THE EFFECTS THAT SUCH OPERATIONS WOULD HAVE ON ENVIRONMENTAL VALUES. THERE IS NO QUESTION THAT INDUSTRY HAS PROVEN THAT IT CAN OPERATE ON THE HARSH AND HOSTILE ALASKAN NORTH SLOPE WITHOUT ANY SIGNIFICANT LONG TERM ADVERSE EFFECT ON THE ARCTIC ENVIRONMENT. WILDLIFE ABOUNDS IN THE MIDST OF THE NORTH SLOPE OIL GATHERING FACILITIES AS MANY OF YOU HAVE SEEN.

OUR OPERATIONS ARE CONDUCTED UNDER A HOST OF ENVIRONMENTAL LAWS AND REGULATIONS. THESE EXISTING LAWS, RULES AND REGULATIONS ARE ENFORCED STRINGENTLY. THE LEASING PLAN FOR THE 1002 LANDS WILL ALSO BE SUBJECT TO THESE REGULATIONS. I HAVE SOME OF THEM HERE: NEPA, THE ENDANGERED SPECIES ACT, FLPMA, THE CLEAN AIR ACT, JUST TO NAME A FEW. MY POINT IS THAT WE HAVE AN ABUNDANCE OF ENVIRONMENTAL PROTECTION LEGISLATION AND REGULATIONS IN EFFECT, PRESENTLY EXISTING, SUCCESSFULLY BEING ADMINISTERED, AND BEING STRICTLY ADHERED TO. FURTHER EXPANSION ON ENVIRONMENTAL

RESTRICTIONS ON EXPLORING AND DEVELOPING THE 1002 AREA ARE NOT NECESSARY AND WOULD IMPEDE THE BASIC GOALS I HAVE OUTLINED.

I HAVE TOUCHED UPON THE PRINCIPLES OF FULL LEASING, COMPETITIVE LEASING AND THE ISSUANCE OF BOTH EXPLORATION AND DEVELOPMENT RIGHTS IN 1002 LEASES. I WILL BE HAPPY TO ANSWER ANY QUESTION YOU MAY HAVE ABOUT AN APPROPRIATE 1002 AREA LEASING SYSTEM.

Mechanical Aspects Of A Leasing Program For the ANWR 1002 Area

1. Jurisdiction within the Department of Interior (D.O.I) falls within two departments, the Fish and Wildlife Service, and the Minerals Management Service.

2. Leasing should be on a competitive, sealed bid basis.

4. Lease terms should carry ten year terms.

5. Minimum tract size should be 2,560 acres.

6. The D.O.I. should have the authority to determine adequacy of bids offered for leasing and to reject inadequate bids, but no minimum bid level should be required.

7. Annual rentals of $3.00 per acre would follow the offshore example.

8. A system outside of the Minerals Leasing Act of 1920, the OCS Lands Act and the Naval Petroleum Reserve Alaska should be developed. The system should be more "coastal plain" specific than exisitng leasing systems.

9. The leasing process need not require additional environmental impact statements for each lease sale when the Secretary's 1002 Report will have incorporated into and the legislative environmental impact statement of the Coastal Plain Resource Assessment pursuant to the National Environmental Policy Act of 1969, already addressed these concerns.

10. Many of the details set out here should be left to the D.O.I agencies which deal with leasing systems on a day to day basis to develop. As was the case in the Minerals Leasing Act and the OCS Lands Act. Such administrative details should not necessarily be made a part of the legislative process, but rather the process should be developed by the Secretary within the framework of the opening legislation.

The **Chairman**. All right. Who would like to speak next? Or would you all simply like to respond?

Mr. **Cook**. Mr. Chairman, if it is agreeable, I will go forward.

The **Chairman**. Yes.

STATEMENT OF THOMAS COOK, EXPLORATION REPRESENTATIVE FOR ALASKA, CHEVRON U.S.A. INC.

Mr. **Cook**. Good morning. My name is Tom Cook. I am employed by Chevron U.S.A. as Exploration Representative for Alaska.

I appreciate this opportunity to appear before the Committee on behalf of Chevron. Chevron supports the basic provisions of S. 1217, which, if enacted, would authorize competitive leasing of the ANWR Coastal Plain. Further, it would allow exploration, development, and production to proceed.

My prepared statement on file with the Committee focuses on the exploration function, particularly exploratory drilling to the point of discovery. And Mr. Herrera will pick up at that point and cover a very important phase that comes after discovery and before development.

At the risk of being unduly brief and keeping in mind your opening statement yesterday, I will try to summarize my testimony with four points.

One, exploration in the Arctic is a very lengthy process, in an area such as the Coastal Plain it is likely to take several years from the point of initial work and leasing to the point of discovery, if we are that fortunate.

And I might point out that a period of at least eight years was required for the discovery of Prudhoe Bay. It began with initial field investigations, followed by seismic work, and a succession of pin dry holes.

Now, with a little luck, and hopefully with some of the field work and field investigations behind us, and the initial seismic work, some two years of reconnaissance work, we hope that that period for discovery will be somewhat shorter.

But nonetheless, I believe that any legislation addressing the Coastal Plain issue should provide for a minimum primary lease term of 10 years.

Two, the chances for success in the exploration process will be greatly increased if industry has access to the entire Coastal Plain.

And I might point out there again that if leasing had been limited to the initial area of interest in the Central Arctic, it is quite probable that the discovery of Prudhoe Bay would have been delayed substantially and perhaps even thwarted, depending on subsequent events. Therefore, legislation should require the entire Coastal Plain to be offered for lease, just as provided in S. 1217.

Third, multiple approaches to exploration are more likely to produce a discovery than a single idea. In other words, legislation for the Coastal Plain should not embody a requirement for government-sponsored exploratory drilling limited to some prescribed number of exploratory wells.

And I would like to go a little further with that, and make it clear that this is not any attempt to impugn or question the capability of agency geologists and professionals.

I think most of us recognize that they are very capable and on a par with industry. I think the point is that any agency or organization, whether it is a large corporation, brings to the table a particular set of exploration concepts, and because of scarce resources those necessarily boil down to one approach.

And the simple fact is that if you have more approaches to exploration, more ideas rather than a single idea, you have more chances for discovery.

My fourth point is that, and again this harps back to a record that you heard a great deal about, extensive exploratory drilling and thousands of miles of seismic work have been conducted in the Arctic for over 20 years, without significant harm to the wildlife and environment.

And in particular the drilling of the KIC No. 1 exploratory well, adjacent to the Coastal Plain, and 1,200 miles of seismic work on the Coastal Plain demonstrate that work can be undertaken without harm to the environment.

Now, the point of these remarks is that legislation should not embody specific detailed operating requirements and stipulation. We think these details are best left to the agencies with expertise in this area, and handled on a very site-specific basis.

My last point concerns a topic which I did not address in my prepared testimony, and I think perhaps because many of us take it for granted. And that is the concept of unitization.

At the production stage, unitization's benefits are very well demonstrated. In the case of Prudhoe Bay, we were able to operate a number or several properties as if they were one lease.

The lessees get together, agree on how to divide the revenues, and share expenses. That is not a process without some consternation. Nonetheless, it is workable. The result is that we are able to consolidate facilities and avoid redundancy. And the happy byproduct of that is that we avoid undue impacts to the environment.

Now, that same concept can be carried over to the exploratory phase. And we should have the opportunity to form cooperative drilling units or exploratory units, prior to discovery.

And this would lead to a more orderly process of exploration. And I think the agencies have the expertise and the power to enforce diligence. With those brief remarks, Mr. Chairman, I would like to conclude my statement.

[The prepared statement of Mr. Cook follows:]

STATEMENT OF THOMAS COOK
ON BEHALF OF CHEVRON U.S.A. INC.
BEFORE
THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
HEARING ON THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE

OCTOBER 14, 1987
WASHINGTON, D.C.

Good morning Mr. Chairman and members of the Committee. My name is Thomas Cook. I reside in Anchorage, Alaska where I am employed by Chevron U.S.A. Inc. as Exploration Representative for Alaska. I appreciate this opportunity to testify before the Committee on behalf of Chevron. Chevron urges the Congress to enact legislation to allow for oil and gas exploration, development, and production on the Coastal Plain of the Arctic National Wildlife Refuge (ANWR).

Petroleum production from Alaska's North Slope during the past decade has proven to be an outstanding benefit to the United States. Industry's history of operations in the arctic also proves that arctic oil and gas resources can be developed without significant disruption of the environment and wildlife.

I understand the purpose of today's hearing is to receive testimony on S. 1217 which would provide for competitive leasing of the ANWR Coastal Plain and allow for exploration, development, and production in the Coastal Plain. In our view S. 1217 appropriately accomplishes the purpose. While some parties express the view that legislation should include very detailed requirements for operations on the Coastal Plain, we believe that these details are best left to administrative agencies with expertise for regulating industry operations and requiring appropriate stipulations for the protection of the environment and wildlife. My testimony will describe the role of the exploratory function and demonstrate the such operations are more than adequately regulated by existing programs. My testimony will also describe the kinds of exploratory activities which will be needed under legislation to allow for exploration, development, and production on the Coastal Plain.

Forecasting the precise scenario for exploration, development, and production which may unfold on the Coastal Plain is impossible because of the many unknowns. Extensive field studies on and adjacent to the Coastal Plain, including a two season seismic survey, show that the area has the potential for large oil fields. However, the actual presence of economic oil and gas reserves on the Coastal Plain can only be determined by exploratory drilling. If exploratory drilling confirms the presence of economic reserves, then we can plan the location and types of facilities required for production. Nonetheless, I believe our presentation today will give you a good idea of the kinds of activities and facilities which may be expected, if exploration and development are allowed on the Coastal Plain.

With this caveat in mind, a few brief remarks on the history leading to the discovery of North Slope fields may serve to illustrate the factors which will shape the exploration scenario for the Coastal Plain.

In the late 1950's and early 1960's, industry geologists undertook reconnaissance field studies in the North Slope foothills and mountain ranges. The primary area of interest was the Central Arctic foothills between the Colville and Canning Rivers. The area west of the Colville River, now known as the National Petroleum Reserve - Alaska, and the area east of the Canning River, encompassing what is now identified as the ANWR, were closed to petroleum development.

These initial studies of rock outcrops in the foothills north of the Brooks Range were followed by seismic surveys in the early-to-mid-1960's on the coastal areas to the north. The first significant competitive leasing occurred in 1964 and 1965 followed shortly thereafter by the initial exploratory drilling. Drilling commenced, first in the foothills south of the Prudhoe Bay area and then to the north in the vicinity of Prudhoe Bay. Ten wildcat wells were drilled before Atlantic Richfield and Humble Oil and Refining (now Exxon) discovered the supergiant Prudhoe Bay field in 1968. Shortly after the discovery of the Prudhoe Bay field, other significant discoveries were made. These include the Kuparuk River, Milne Point, and Lisburne fields. It should also be noted that exploration leading to these discoveries was undertaken during a period of plentiful crude oil supplies and at a time when crude oil prices were historically low; in other words, when market conditions were similar to conditions in today's crude oil market.

There are several points to this short recapitulation of the exploration history leading to the discovery of major North Slope fields which are relevant to competitive leasing on the ANWR Coastal Plain:

1. Exploration in a frontier area such as the arctic is typically a lengthy process requiring many years. Attached to my testimony is a short briefing paper which shows the time line which has been experienced for producing fields on the North Slope and a reasonable estimate of the timing for Coastal Plain production, assuming a decision to open the area occurs in the next few months.

2. Exploration in a frontier area requires access to broad areas and the opportunity for the application of diverse exploration strategies and geologic concepts. Multiple approaches to exploration

are more likely to produce a discovery than a single idea. (In excess of 1.8 million acres were offered for lease in the first two arctic sales of which about 1.1 million acres were leased. The acreage opened to initial leasing in the Central Arctic is about the same size as the Coastal Plain.)

3. With the long lead time required to bring new arctic discoveries into production, current supply/price conditions are less relevant than anticipated supply/price conditions several years in the future.

4. Extensive exploratory drilling and thousands of miles of seismic surveys have been conducted in the Central Arctic for over twenty years without significant adverse impacts to the environment and wildlife. This record shows that similar exploration operations could be conducted on the Coastal Plain compatibly with the environment and with protection of wildlife.

5. Past exploration in the Central Arctic indicates that industry will undertake costly exploration ventures if there are prospects for large discoveries and a competitive leasing program with reasonable terms and operating requirements.

6. The national interest would be served by the discovery of large petroleum reserves on the Coastal Plain, just as it has benefited from earlier discoveries on the North Slope during the past decade.

Although the number of exploratory wells required for discovery on the Coastal Plain cannot be known, experience in the Central Arctic suggests that about ten exploratory wells may be drilled over a three-to-five year period before a significant discovery is made or the area's petroleum potential is downgraded and industry's incentive for further drilling is lessened. Do not attach to much significance to the estimate of ten wells during the initial years of exploration. This is simply an educated estimate of the level of exploratory drilling that might be expected to occur during the first few years, if the industry is allowed access to the Coastal Plain.

What can be stated with certainty is that we will never know the extent of petroleum resources beneath the Coastal Plain unless exploratory drilling is allowed. The best way to assure that adequate exploration is undertaken is to open the area to competitive leasing with the right to develop and produce if economic reserves are found. If commercial reserves are found, there will be time to plan and design development in a way to protect the environment. If exploration fails to find economic reserves, there will be no significant impact on the wilderness character of the Coastal Plain.

Before I comment on some specific joints about exploratory drilling, I will comment briefly on the role of geophysical operations in the exploration process. Geophysical surveys (seismic surveys) are an important means of identifying subsurface structural features which may trap petroleum. Limited and carefully controlled seismic surveys to assess the petroleum potential of the Coastal Plain were allowed under provisions of the Atlantic National Interest Lands Act. After preparation of an environmental impact statement, Geophysical Services, Inc (GSI) conducted two winter seasons of seismic surveys (winters of 1983/84 and 1984/85) on the Coastal Plain on behalf of twenty-two oil company participants. Data werecollected using a baried explosive energy source during the first season and vibrators during the second season. A total of about 1200 miles of data were collected and an additional 271 miles of data were gathered outside the Coastal Plain then into an offshore seismic grid.

Field operations during the seismic surveys were continually monitored by personnel from the U.S. Fish and Wildlife Service who were present at all times during operations on the Coastal Plain. Care was taken to insure a minimum of disturbance to any aspect of the environment. When data collection was completed and the snow cover had melted, the operations area was inspected on a line-by-line basis and a final clean-up program was conducted.

Conducting seismic surveys during the winter months with the tundra frozen and blanketed by snow results in insignificant impact to the tundra surface. Following inspection, government regulatory agencies concluded that there had been no significant impact to the tundra or wildlife population as a result of the surveys on the Coastal Plain.

Now I will focus on the logistical and operational requirements for exploratory drilling in the arctic. In recent years, Chevron and the industry have drilled numerous remote exploratory wells on Alaska's North Slope. Many of these exploratory wells have been drilled in areas which are similar to the environment of the ANWR Coastal Plain. From an operational and logistical standpoint, these drilling operations are representative of what will be required to evaluate the petroleum potential of the Coastal Plain. The location of Chevron's exploratory operations are shown on a map attached to my statement.

In the arctic, the construction of a remote exploratory drillsite and mobilization of the drilling rig and supporting facilities take place during the winter when frozen ground allows access without damage to the tundra. Heavy construction equipment is required to build a drillpad, reserve pit, ice/snow roads, and a temporary airstrip. Once the drillsite is constructed, the drilling rig, camp, and other support facilities are moved onto the location by aircraft or specially designed vehicles which transport heavy equipment and supplies across the tundra without degradation of the surface. After drilling is completed, the camp, supplies and drilling equipment are removed either by airlift or across frozen tundra with adequate snow cover to avoid damage to the surface. During the following summer, final site cleanup is completed and rehabilitation is done in accordance with established regulations and stipulations. This is a very brief description of the sequence of mobilizing, drilling, and demobilizing an exploratory drilling operation.

However, before any of the activities associated with drilling an exploratory well can be undertaken, the operator must acquire numerous permits and approvals. A typical plan to drill an arctic exploratory well generally requires six to nine months just to acquire the necessary permits and approvals. From an oil industry perspective, permitting schedules include the time required to prepare the appropriate documents, environmental and engineering analyses supporting the applications, and the processing, review, and public input schedules specified in the regulatory programs.

Over a dozen permits, plans, and approvals are required to construct the necessary pad and reserve pit and drill a well on frozen tundra. At the federal level, the principal regulatory agencies with authority over arctic drilling, depending upon location, are the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and in some cases the National Marine Fisheries Service. These federal agencies all have various programs for the purpose of protecting air and water quality, minimizing impact to the tundra, protecting wildlife habitat, and avoiding disturbance and harassment of wildlife. Most of these agencies require a detailed description of the planned operation and each agency has the broad authority to impose special requirements on a case-by-case basis.

At the state level, the Division of Governmental Coordination, the Departments of Environmental Conservation, Fish and Game, Natural Resources, and the Alaska Oil and Gas Conservation Commission all have comprehensive regulatory authority over industry operations. The State of Alaska has recently implemented new approval procedures to assure consistency with the Alaska Coastal Management Program and to provide for broad interagency and public review of oil and gas activities.

The logistics of Chevron's KIC #1 exploratory well, which was drilled on native-owned acreage about 14 miles east-southeast of the Village of Kaktovik, may be of more specific interest to the Committee. The drilling of the KIC #1 demonstrates that exploratory drilling can be conducted on the Coastal Plain with minimal impact on the environment and wildlife.

Mobilization to the drillsite began in December 1984. Equipment was moved across the shorefast ice to the location and a temporary airstrip was constructed of snow and ice. Materials for the pad construction were then flown in by Hercules C-130 aircraft. A temporary pad was constructed using two layers of high density styrofoam, overlain with two layers of heavy timbers. With the temporary pad in place, camp facilities to accommodate approximately 70 workers and the drilling rig were flown in and placed on the pad. Ice and snow roads were constructed to connect the drillpad with the airstrip and the nearby lake which was used as a water supply. The entire operation was supported by air and Rolligon across the sea ice and ice roads from Deadhorse. Drilling commenced on February 18, 1985 and continued until May 6, 1985, when drilling was suspended.

In the late fall of 1985, after freeze-up and with snow cover to protect the tundra, crews established a new airstrip -- this time on sea ice. New ice and snow roads were built to connect the drillsite with the nearby lake used as a water supply and with the airstrip. The drilling rig and camp were re-mobilized and drilling resumed on November 24, 1985. Drilling operations ceased on April 19, 1986 and the well was officially plugged and abandoned on April 24, 1986, after reaching a total drilled depth of 15,193 feet.

The drilling rig and camp were dismantled and removed from the drillsite during late April and the first part of May using Hercules aircraft and the Rolligons. Time and scheduling are absolutely critical factors in any arctic seasonal drilling operation and it was important to get the rig and camp off location and back to Deadhorse before break-up. Otherwise, we would have incurred additional stand-by costs for the rig and camp until the following winter.

During the summer of 1986, crews dismantled the drillpad. Timbers and the styrofoam insulation were stacked and banded for removal this past winter when freeze-up and snow cover provided the opportunity for travel across the sea ice and access to the drillsite without damage to the tundra. The capped reserve pit was fertilized and seeded with arctic grass seed during the summer of 1986.

This past summer crews returned to the KIC #1 drillsite by helicopter for final cleanup and rehabilitation of the location. The pad area of about 400 by 450 feet was contoured to original grade and the area was also seeded and fertilized. Grass on the reserve pit area from the previous summer's seeding program was well established one year after seeding. Our rehabilitation of the drillsite is now complete and there is little evidence of the operation except for the marker post installed at the location of the well-bore, which is required by state law. Representatives of the Alaska Oil and Gas Conservation Commission have inspected the abandoned location and determined that the drillsite has been left in a satisfactory condition in accordance with state law. The U.S. Fish and Wildlife Service has monitored all aspects of our operations at the KIC #1 drillsite Chevron and U.S. Fish and Wildlife Services will continue to monitor the rehabilitation and revegetation of the drillsite during the coming year to determine if there have been any significant impacts to the tundra. We have complied with all recommendations and requirements of the U.S. Fish and Wildlife Service in the conduct of the KIC #1 operation and rehabilitation program.

The Plan of Operations for the KIC #1 exploratory well was subject to a lengthy review process which involved the U.S. Fish and Wildlife Service as the principal agency, along with numerous other federal, state, and local agencies, before final approval for the operation was granted. The requirements imposed on the operation, as a result of this approval process which specified how the operation would be conducted, proved feasible and provided a very strong measure of protection for the environment and wildlife. However, it should be noted that the requirements for the KIC #1 operation were worked out on a site specific basis in what proved to be a constructive and cooperative planning process with various regulatory agencies.

If the well had been in a different location or drilled to a shallower depth, there would have been alternative methods of drillpad construction, provisions for water use, and different time constraints on operations which would have been appropriate for another location and depth. However, because of the depth of the well (15,193 feet) and the concern for waterfowl habitat and the potential use of the area by caribou in late June and early July for insect relief, there was a need for a drillpad which would afford protection of the permafrost during the summer months when operations were suspended. If the geologic target had required a shallower test well on the order of 6,000-7,000 feet, the drillpad could have been constructed of snow and ice or a combination of snow, ice, and timber. Given the particular site specific circumstances, other alternatives which could provide a suitable drillpad include conventional a gravel pad (five foot layer of gravel on the tundra) or thin pad construction (a one foot layer of gravel over styrofoam insulating material). It is important that the regulating agencies retain the flexibility to require the most feasible type of operation from the standpoint of economic viability, safety, environmental protection, and proven technology.

Limited time constraints on operations appear to be warranted in areas of high use by wildlife. However, shutdowns should not be imposed without justification because such requirements are extremely costly. Year-round exploratory drilling has been done many times in the arctic and, if justified, can be done without significant environmental impact.

Problems with the availability of fresh water have been raised as a potential problem for operations on the Coastal Plain. The fact is there are many ways to provide sources of fresh water on the North Slope, and the ANWR Coastal Plain is no exception. In the case of the KIC #1 operation, water was available from a nearby lake with sufficient depth to provide a winter supply. If this source had not been available, desalinization of nearby salt water or well water could have provided a source of fresh water. Another alternative is the collection of snow and the use of a snow melter. In fact, over 80% of the water used for the construction of the airstrip during the first year of operations and the ice road across the tundra to the freshwater lake for both seasons was in the form of collected snow. The important point to remember is that fresh water availability on the Coastal Plain is no different than other areas of the North Slope where industry has drilled many exploratory wells.

Industry has developed a variety of techniques for mobilizing and conducting exploratory drilling in the arctic. These techniques provide solutions to potential problems with exploratory drilling on the Coastal Plain. Industry has the proven capability to conduct exploratory drilling on the Coastal Plain with minimal impact to the environment and wildiife of the Coastal Plain.

Thank you for the opportunity to testify on behalf of Chevron.

Briefing Paper

ANWR COASTAL PLAIN DEVELOPMENT TIMING

The final 1002 report recognizes that if there are commercial finds of o made today in the Coastal Plain it could take as long as 10 to 15 years befo those resources could be brought to production (page 190). The attach figures and following discussion gives some past history on North Slo development and provides the rationale for expecting such long lead times bring reserves to market.

Figure 1 illustrates the phases of development of some of the major oil fiel of the North Slope. While there were political, economic, and environment factors affecting the Prudhoe Bay oilfield development timing which fir delayed then expedited production of that super-giant field, oil began flowi through the trans-Alaska Pipeline Systems (TAPS) in 1977 about 13 years aft initial exploration and about nine years after discovery.

Although, the Lisburne and Kuparuk oilfields were discovered about the sam time as Prudhoe Bay, development of these fields was deferred for severa years pending development of the super-giant Prudhoe Bay field and TAPS Depending upon the order and size of discoveries, it is likely that a fiel large enough to justify development would be developed first followed by othe fields. For information Kuparuk production began in late 1981, nearly 1 years after discovery and Lisburne production began in 1986, about 18 year after discovery. A more recent development, the Endicott oilfield, is due t begin production in late 1987, almost ten years from discovery.

Based on past experience, Figure 2 provides a more detailed breakdown of likely timing of events from the leasing decision to first production from th ANWR Coastal Plain. This figure illustrates that first production from th Coastal Plain would not occur until about the year 2002. The almost nin years from discovery to first production allows for three years of delineation drilling; three years planning, design, EIS processing and permit acquisition; and almost three years for development drilling, construction of facilities and pipeline(s) and start-up. Factors which could extend development tim after discovery include seasonal restrictions on delineation drilling a construction; regulatory framework; size and location of the reservoir(s stipulations and mitigation requirements on development permits and approvals and litigation on EIS and permit decisions. Figure 2 illustrates timing t initial production. Peak production would occur some years later.

Figure 1

DEVELOPMENT TIMELINES FOR NORTH SLOPE OIL FIELDS

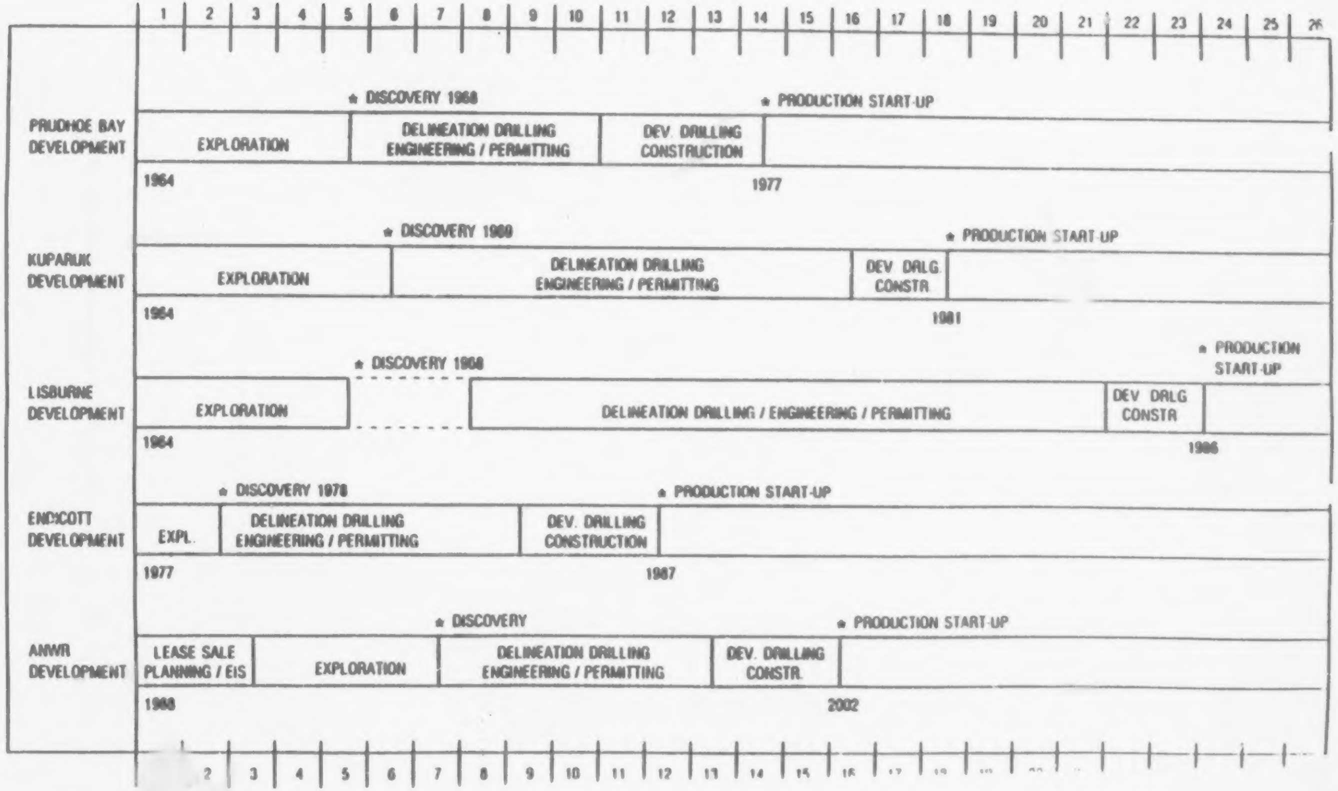
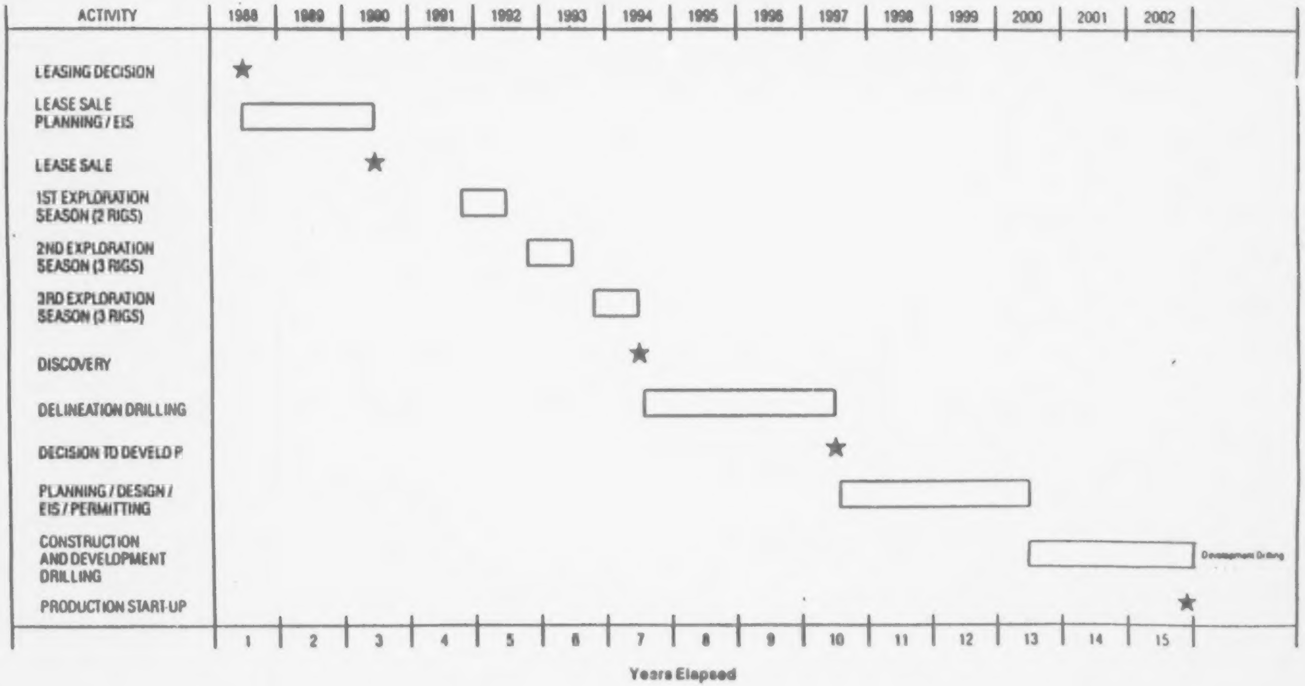
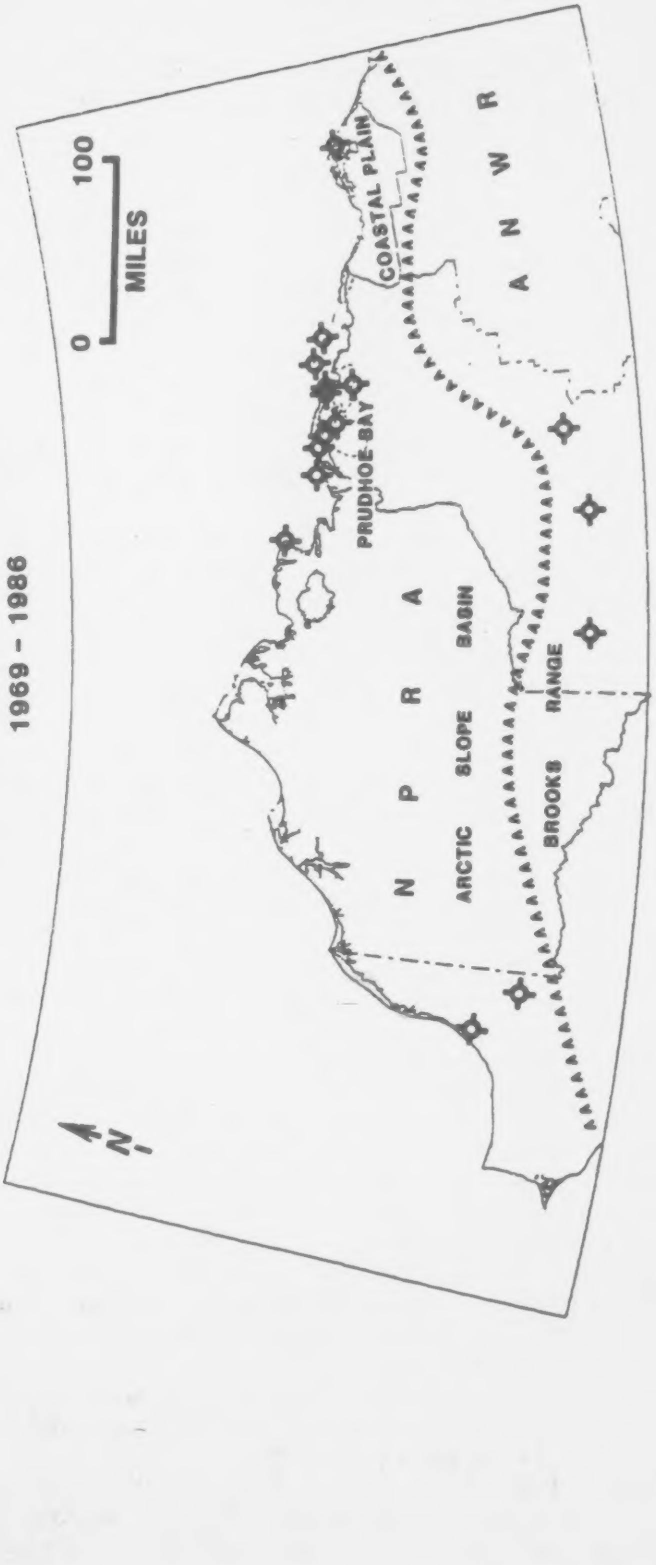


Figure 2

DEVELOPMENT TIMELINE
ARCTIC NATIONAL WILDLIFE REFUGE



CHEVRON EXPLORATORY WELLS
1969 - 1986


0
100
MILES
N
N P R A
ARCTIC SLOPE BASIN
BROOKS RANGE
PRUDHOE BAY
COASTAL PLAIN
A N W R

The **CHAIRMAN**. Thank you very much, Mr. Cook.

Mr. Herrera.

STATEMENT OF ROGER C. HERRERA, MANAGER OF EXPLORATION AND LANDS, STANDARD ALASKA PRODUCTION CO.

Mr. **HERRERA**. Mr. Chairman, my name is Roger Herrera, and my remarks today are those of the Standard Oil Company in Alaska.

Specifically what I would like to do is talk about Senator Murkowski's bill in relationship to, as Mr. Cook outlined, one phase of the operations in the real world, in the Arctic, and that is the delineation phase which happens after one makes a discovery.

I think in the public mind the discovery is the be-all and end-all of the activity. In fact, it is just the beginning. It is a sort of exciting event.

But it really just sets the clock running for a decision-filled period, which unfortunately can last anything from about 10 to 20 odd years.

I think if a bill out of Congress is going to be practical and beneficial to the Nation, it has to look very carefully at this phase, because it is a time when, it is the phase when literally years are burned up.

And obviously the end result of any bill on ANWR should be the safe production of oil, eventually. That is the bottom line. That is what we are trying to do, safe in physical terms and in environmental concerns.

So let me just spend a moment discussing this delineation, drilling phase, and lots of points will come out, which I think are pertinent to legislation.

First of all, the fact that one drills a discovery well, which obviously finds oil, does not answer many questions. It just tells you there is oil there.

The operator then has to go through the quest of actually finding how much oil is there, how produceable is it, what is the economics of that accumulation, and so on and so forth before he can make a decision that this is a commercial proposition.

Now, that is the important point. When the decision is made, this is a commercial oil field, and one sets in motion all these sort of administrative procedures to develop that field.

Until that time, you are sort of using up time, almost in a frustrating manner, because you know you have got oil there, you do not know if you have got enough.

A major point about this is that if you look at the history of this delineation drilling phase in some of the established oil fields in Prudhoe Bay, one finds that it has used everything from three and a half years to over 10 years.

In fact, in one case, 13 years after the discovery well was drilled, before the decision that the oil accumulation was commercial was reached. Now, that is a long period of time.

Now, my point is that the subsequent time periods, when one goes through administrative procedures, NEPA, environmental impact statements, and so on, and then after the permits are issued, one starts actually physically constructing the oil field, are fairly tight.

There is not much one can do about those time periods. Three years for an EIS and permits. Perhaps two to three years for constructing the oil field, bringing it on to production.

This first phase, though, from 3 to 10, 12, 13 years, is so flexible as to be worrisome. Now, my point is, how can legislation help to cut that period down? And there is a good answer, it can be done, and it should be done.

There is no reason why an operator should take an extended period of time to ascertain just how much oil he has and how commercially viable it is. After all, just the incentive of making the discovery should be enough to make that operator spend money to find out this information.

The frustrating part of it, though, is in the Arctic that delineation wells are treated exactly the same as exploration wells. And we all know that exploration wells are preferentially drilled in the winter, are benign when they are drilled in the winter, and therefore it is a general rule that they should be drilled in the wintertime.

That rule should be modified the moment a discovery is made. And I think if there is careful language put in new legislation which allows this to happen, it will be highly beneficial language to everybody.

The **Chairman**. How would you modify it?

Mr. **Herrera**. Very simply, as soon as a discovery is made, the rule of seasonal drilling becomes flexible. In fact, the option is given for year-round drilling.

Now, I say this because I do not think people have understood sufficiently the capabilities of industry of drilling year-round in an exploration mode, if you like, before there are permanent facilities around, without damaging the environment.

But if you look at the record of such drilling on the North Slope of Alaska and the Arctic, you find that there are many, many examples of wells which have been drilled through the summertime. And none of those examples have been shown to have caused any environmental harm. In other words, it can be done and it has been done. Why should it not therefore be done when we have got something specific to aim at?

And that is, cut down this delineation drilling period, this period of indecision before you know you have got a commercial oil field on your hands.

So what I am suggesting is that it is quite reasonable to put in legislation a rule, if you will, or a finding that year-round drilling shall be allowed by any operator that has made a discovery, in order to accelerate this decision of commerciality.

The **Chairman**. What kind of discovery? Any discovery?

Mr. **Herrera**. How does one define a discovery in the Arctic? That is very difficult, actually, Mr. Chairman.

But I think there are rules of thumb which have been used over the last decades. The State of Alaska, for example, has a rule of thumb—it is not firm but it is being used—that 2,000 barrels of oil a day on a production test from an exploration well is indicative of a possible future commercial accumulation of oil, and therefore is considered a discovery.

One could make it 3,000 barrels. It really is arbitrary. But certainly 2,000 barrels of oil tested from an exploratory well is a significant find. Whether it is commercial is another thing. But it is significant. And that is a reasonable definition of a discovery, I think, on appropriate amount of gas.

But thereafter, the agreement that year-round drilling could be allowed, with appropriate environmental protection, should accelerate that decision to proceed with the commercial development of the field by years and years and years, and surely that is a beneficial end result.

Let me talk now about the next stage. One has made the decision that this is a commercial proposition. And economics are always going to enter into that. I know you are aware of that, but it is worth stressing.

Then, I think there is less than adequate realization of the process which exists today. Now, this is, I am not going to spend a lot of time on this, Mr. Chairman, just a minute or two.

But I think it is worth stressing, because the process which is in place today, which is followed, which has direct examples of how it works in the Arctic, is an extraordinary, thorough, and good process.

And in my opinion, Senator Murkowski's bill, for example, if it said nothing other than existing rules and regulations and laws should prevail, would more than adequately protect the environment of ANWR.

And I say that being able to point to examples of how the processes do work. The environmental impact statement process for a development in the Arctic is very thorough. It lasts at least two to three years.

If you look at the historical record, it has inevitably been three years. It involves multiple agencies, it involves the North Slope Borough local government, the State of Alaska, the Federal government, irrespective of the ownership of the leases. All three are intimately involved in the process.

Everybody has different ideas. And usually, and inevitably the end result of an EIS process and the permitting that goes with it is the issuance of a permit. That is not inevitably the end result. It could be the non-issuance, which is worth mentioning.

But when the permit is issued to develop, multiple permits, it is a compromise. I mean, it is not perfect from anybody's viewpoint, certainly not from the operator's. He has had to swallow all sorts of things which he knows in his own mind are not necessary, sort of goldplating and so on.

And similarly, the environmental agencies have to swallow things which they think are doubtful, have question marks about them, are not absolute certain guaranteed protection of the environment.

So a compromise comes out. But in human terms I think it is the best solution that can be arrived at to develop an oil field in the Arctic. And you know, the Arctic has the same sort of physical conditions, whether it is at Prudhoe Bay or on the Coastal Plain of ANWR.

And what I am saying very clearly is, and one can examine the Endicott example to back up my comments, is that the existing NEPA process does result in the best oil field that human beings can devise.

That is both in the way of getting oil out of the ground and protecting the environment, where that oil field is situated. Now, the actual construction phase is something which I do not want to go into.

There are certainly constant improvements, which one can expect industry to put into that phase and so on, as they should. But, my bottom line, my conclusion of what I have just said to you, Mr. Chairman, is that one can if one wishes put lots and lots of stipulations into legislation.

And in some regards, you know, industry is better off if you do that, because we know the costs of doing business up front. However, if you inadvertently left out a stipulation which in fact would have been important, I do not think you have anything whatsoever to worry about.

Because the NEPA process, which is inevitable for any development scenario in the Arctic, will fix that oversight and put that protective stipulation into a permit. So, there is no jeopardy.

If legislation does not have the required detail in its environmentally protective stipulations, the subsequent process will fill the gap.

Let me, if I may, just in finishing, and there are many unmentioned things which are worthy of further discussion, as I am sure you know, let me just mention one thing, and that came up yesterday from the State of Alaska.

The State of Alaska was very keen on setting up, I do not know what they call it, a consultation medium, a commission, a committee with the Federal Government to oversee and coordinate development in ANWR.

In theory that is exemplary. In practice it already works. And anybody that says it does not I do not think is understanding what goes on during the NEPA process and during the permitting process in general.

Practically every action in ANWR, in the Coastal Plain, will require a 404 permit. A Corps of Engineers permit. Because the whole of the Coastal Plain is defined as wetlands.

Consequently, the State of Alaska, in essence, has veto over every action which is proposed on the Coastal Plain, irrespective of the fact that only Federal leases will be involved.

Veto through the Coastal zone consistency determination process, which enters into permitting at various stages. Clean Water Act, 404, and so on and so forth. They have multiple opportunities to say no, this is not viable, and this cannot go forward any further. That is veto authority.

Furthermore, part of the 404 process involves all the relevant agencies. They all are part of that process in a direct fashion. Now, if that is not coordination between state and Federal agencies, coordination cannot exist.

My point is that it is a viable ongoing process today. And therefore, to give it an extra layer of bureaucracy by giving it a title I do not think is achieving anything over and above the present coordination between governments that takes place.

My concern, which I will voice, if I may, is that the reason the State of Alaska wants such a group commission, committee is simply to get the oil industry to fund it up front.

And quite frankly, I do not want to fund an extra layer of bureaucracy which does not achieve anything above which is already being achieved. So I would come down strongly against encouraging the State of Alaska to formalize something which is already working very well.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Herrera follows:]

TESTIMONY OF
ROGER C. HERRERA

MANAGER OF EXPLORATION AND LANDS
STANDARD ALASKA PRODUCTION COMMITTEE

BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

WEDNESDAY, OCTOBER 14, 1987

Mr. Chairman:

My name is Roger Herrera and I am Manager of Exploration and Lands for Standard Alaska Production Company in Anchorage, Alaska. I am testifying today on behalf of Standard Oil/BP America with whom I have been employed during 15 years experience of oil exploration and development in Alaska and 20 years in the Arctic regions.

My comments today are confined to a brief description and analysis of the so-called "delineation phase" of oil activities, which is the period of time and operational actions that post-date the drilling of a discovery well and pre-date the construction and development of a new oil or gas field. Many of the site-specific ground rules pertinent to long-term production of hydrocarbons are established during this phase. Consequently, a clear understanding of what normally transpires after the discovery well has been announced is crucial to the preparation of any legislation which permits exploration and development on the Coastal Plain of ANWR.

To the lay person the delineation phase is a gray period which does not reasonably fit either into exploration activities or into the development period. It is poorly understood, yet, in reality it is the most important, decision-filled period in the whole cycle of operation activities leading to production.

The mere drilling of a discovery well, while an exciting event, does little to determine the final outcome of the quest for oil. It is certainly a catalyst for further action and it starts the clock ticking on the 10 to 15-year period which precedes eventual production in the Arctic. Nevertheless, the commerciality of the discovery is far more important than the discovery itself.

Looking at past history it is interesting to note that the Kuparuk oilfield, the second largest field in the United States, required the drilling of 20 step-out or delineation wells before enough geological and engineering data were obtained to reach the decision on whether or not to develop the field. As you know, despite the fact that those 20 wells confirmed the presence of 1.45 billion barrels of recoverable oil in the Kuparuk sandstones, it was the existence of the trans-Alaska pipeline which tipped the balance in favor of development. Without that usable infrastructure, the Kuparuk oilfield would still be an uneconomic, unexploited oddity. Even with the knowledge that the trans-Alaska pipeline would be available to Kuparuk oil, the complexities of the oil reservoir and its less than ideal producibility characteristics puzzled and frustrated the geologists and petroleum engineers for almost ten years before they were able to make the difficult decision to develop the field. Once that decision was reached, the actual construction of the field with its facilities, roads, pipelines, camps, etc. took about three years before production commenced.

In the case of the Milne Point field, which has in excess of 60 million barrels of producible oil reserves, nine delineation or step-out wells were required after the discovery was made in 1969. The size of the Milne Point field was obviously sub-marginal at the time of its discovery but the economic benefits which accrued from the development of the nearby Kuparuk field supplied the incentive to proceed with development. The difficulties and risks of such a decision are exemplified by the fact that the field is now shut-in as a result of the unforeseen fall in world oil prices in 1986. This example, once again, points to the importance of the delineation phase and to the time period, in this case 16 years, which it can occupy.

Perhaps a more typical case study which better exemplifies what might happen on the Coastal Plain of ANWR after a discovery and before production, is supplied by the Endicott oilfield. That field, situated 15 miles northeast of Prudhoe Bay and three miles offshore in the shallow waters of the Beaufort Sea, commenced production a few days ago, nine years and nine months after the discovery well was drilled.

It was first discovered by the Sag Delta #4 wildcat well early in 1978, and by 1982 after seven further step-out wells were drilled enough information was available to make the decision that the field was economically viable. In 1982, the first of over 2,300 lbs. of paperwork was submitted to the Army Corps of Engineers to trigger off a full scale environmental impact statement (EIS) and subsequent permitting procedures. The EIS and permitting took the involved three levels of governments and 13 agencies three years to complete and in February 1985, permission to proceed with the construction and development stage of the field was given. Twenty-five major permits were required and every aspect of the future field was examined, analyzed and individually subjected to operational stipulations. The actual construction of the oilfield took a further two and a half years.

There are some important lessons to be learned from these case histories, and some of those lessons may have a place in ANWR legislation. It is obvious that ascertaining the parameters which are needed to make the all important decision on whether an oilfield is economically profitable is very difficult and time-consuming. This period of uncertainty during which data is collected from step-out wells, has varied from three to thirteen years and involving seven to 20 wells. How can it be accelerated?

The answer to that question is largely a function of the geology, but there are operational solutions too. There is an increasing mindset on restricting all drilling activities, other than production drilling, to winter only time periods. There are known advantages to drilling in the winter in the Arctic, but there are also known capabilities of drilling, equally responsibly and with equal protection of the environment and wildlife, in the summer time. Delineation drilling after a discovery should be allowed year round and legislative language should specifically encourage that, and make it the norm rather than the exception. Techniques to drill in the arctic summer are available and proven. Helicopter transportable rigs and helicopter supply of rigs are normal tools used worldwide. The utilization of helicopters to move modularized platforms has been practiced in jungles and swamps in Papua New Guinea and South America and is applicable to permafrost areas. Costs of drilling outside the winter season are high but if they accelerate the onset of eventual production by one to three years, without detriment to the environment, they are justified.

Similarly, why, even during the exploration phase, is winter drilling precluded before November 1st? (This date is stipulated on state leases and on ASRC private lands.) When industry follows this dictate, it is almost impossible to start an exploration well before Christmas or the New Year; consequently, deep wells require two seasons to drill and cost $50 million or more. If an operator was allowed, in areas where wildlife would not be affected, to start operations in September using helicopter support, such a well could be drilled in one season and cost $15 to $20 million less. Surely that is a positive result worthy of serious consideration!

The benefits of writing operational stipulations into an ANWR bill are, politically, obvious. They would represent a congressional mandate to protect the environment. Such statutory language is also beneficial to industry if only because it spells out the ground rules under which we can operate up front prior to a lease sale. However, we know from long experience that rules, regulations and stipulations are most effective if they allow for improvements in techniques and practices to be used as they are developed. Stipulations are best written as performance standards rather than inflexible laws.

It is very easy to stipulate the oil industry out of existence in the Arctic, and human tendencies to double or triple existing environmentally protective measures on the assumption that the end result will increase protection of the environment by two or three times is prevalent, naive and incorrect. For example, if peregrine falcons are unaffected by industry activities one mile away, they are not doubly unaffected if the activity is moved two miles away. On the other hand, the activity itself may become uneconomic if it has to move two miles away.

Somewhat similar is the inclination to mandate the collection of more physical and biological data. The collection of arctic data seems to be an insatiable urge which has little or nothing to do with the quest for knowledge. At Endicott, for example, $8 million of new environmental information is collected each year, and a staggering amount of data is generated. It is rather sad, therefore, to observe that the benefits of such data are being lost on dusty shelves, or deliberately ignored because no governmental agencies are able to spend the time or money on appropriate analysis of the data. It is not sufficient to demand the study of biological and environmental issues unless the effort is properly focused and prioritized and is translated into some practical benefits. The problem in ANWR will not be lack of information, but rather a lack of ability or opportunity to review and understand the information which is available. Perceived environmental problems in the Arctic are rarely solved by throwing the oil industry's money at them, but most of them succumb to a combination of common sense and care.

If statutory ANWR language is not all-encompassing and complete in its efforts to achieve total protection of the Coastal Plain, no one should be too concerned. The environmental impact statement and permitting experience at Endicott clearly indicates that the NEPA process works extraordinarily well, and, on a site specific basis, comes close to guaranteeing rational and acceptable development of an arctic oilfield. It points to the necessity of a development decision in ANWR being subjected to that administrative process, and illustrates how well existing environmental regulations work in the arctic regions. How wonderful it would be if the whole NEPA process could be carried out in one year rather than three!

In this testimony I have mentioned some specific and general ways in which the bill introduced by Senator Murkowski, S. 1217, The Arctic Coastal Plain Public Lands Leasing Act of 1987, could be strengthened or modified. However, I have also tried to convey to you my company's conviction that if S. 1217 was passed in its present form, it, together with existing laws, regulations and stipulations, would ensure responsible oil and gas exploration and development on the Coastal Plain and at the same time ensure the degree of environmental protection which that area deserves and needs.

The CHAIRMAN. Thank you very much, Mr. Herrera.

Mr. Weeks.

STATEMENT OF JIM WEEKS, MANAGER, PRUDHOE BAY FIELD OPERATIONS, ARCO ALASKA, INC.

Mr. WEEKS. Thank you, Mr. Chairman. I am Jim Weeks, Manager of Prudhoe Bay Field Operations for Arco, Alaska.

We are proud of our operation, Mr. Chairman, and glad you and your Committee had the opportunity to tour them this summer and extend you an invitation to come back at any time.

Since 1973 I have been involved with the development and operation of all of Arco's properties on the North Slope. This morning I would like to deviate substantially from my written testimony, which many of you may have seen in the notebooks, and confine my remarks to more appropriately address the concerns that are on your minds today.

I would like to do that through taking you through a hypothetical development example of how a couple of properties in ANWR might be developed, and using these exhibits, and through that process touch on some points that I think will influence your thinking regarding Senator Murkowski's bill.

The whole point of my testimony is geared to reinforcing what Roger so eloquently said, that we see the current regulations, the current laws governing oil and gas operations in the Arctic as plenty satisfactory, and through this process I hope you will see that as well.

What I have done is, if your will look at exhibit one, is select two hypothetical developments right out of the 1002 report, prospect 19 in large prospect, and prospect six. And the assumption is strictly hypothetical.

I have assumed that the report is deadly accurate, that the oil is there in the volume suggested, and at the depth suggested by the report, and it is merely a matter of developing it.

I think it is reasonable to assume that prospect 19 would be developed first, because very large accumulations would be needed to justify the development of smaller ones.

I will start my testimony with, from the standpoint of we will assume that the EIS process has been accomplished. We will assume that all the permits are in place and we are ready to develop.

I am prepared, if you would like, to go into the issue of water availability and gravel availability and those things, because I know those are somewhat on your mind. For the sake of time I am willing to forego that. So I would defer to your guidance on that.

The CHAIRMAN. Well, we have had a lot of testimony about water and gravel availability, and I think, as I would appreciate it, that addresses itself really to each drilling site rather than, I do not think you can write into the legislation any particular formula for doing that, which is one reason I think you have got to have an EIS for each drilling site or certainly each lease. Would you agree with that?

Mr. WEEKS. I would not think you would necessarily need an EIS for each lease. I think each development, for instance like prospect 19, perhaps, or each major impact.

There will be many, many leases comprising that large of a development.

The CHAIRMAN. Prospect 19 is one geologic formation that would have a common method of development?

Mr. WEEKS. Yes, sir.

The CHAIRMAN. You are saying that the EIS should be on a prospect and not on a lease?

Mr. WEEKS. Yes, sir. Or on a major action. Prospect 19 is several tens of thousands of acres and conceivably dozens and dozens of leases. But it is one action, essentially.

The CHAIRMAN. As a legal matter, I do not know whether each lease would be an action, or each prospect would be an action.

Mr. WEEKS. It may even be each area. Some of the prospects are——

The CHAIRMAN. The lease sale, I think, would be the major action. It might be a number of leases, I mean there would be a number of leases within the lease sale, and they may or may not lease the whole prospect at that time.

There would be certainly a commonality with each lease in the prospect. But there might not necessarily be so.

Mr. WEEKS. Well, let me proceed with the testimony, then we can get to the questions.

Suffice it to say, relative to water and gravel resources in ANWR, sufficient study has been done that it is difficult to assess the specifics, because not enough specific information is known.

But water availability will not be an issue at ANWR. Gravel availability will not be an issue at ANWR. Those commodities exist in copious quantities all over the North Slope. We will not take them from springs or fish-bearing rivers or any of those things.

I am prepared to go into more specifics, if you would like. But I will continue.

I also agree, the first thing we do we build ice roads into the area, open up the mine, gravel mine source. Through the mining of that source, we place gravel roads down, pads down, to develop the prospect.

I want to reinforce what Roger said about the section 404 process. That process, the Corps of Engineers, is the leading agency and is compelled by law to obtain input from all the agencies, state, Federal, and local agencies involved, and the EPA, the two state agencies that were here yesterday, the U.S. Fish and Wildlife Service, the North Slope Borough, all of those folks' input into the process.

And the Corps is compelled, through the public hearing process and other means, to input their thoughts into the process through the stipulations on the permit. That process works, we are familiar with it, that is the one the EPA yesterday recommended, as you recall.

Their concern was that the Murkowski bill was a little vague. But I would like to quote, and we agreed 100 percent with their recommendation, and I quote, a functioning regulatory structure is now in place for North Slope activities and should be retained to provide efficient and effective environmental protection, end quote.

If the Murkowski bill is vague, we suggest that the Murkowski bill be modified to clearly stipulate that existing regulations and laws are sufficient to adequately protect the environment.

And for the same reasons Roger surmised, I see no value added in creating another tier of regulation through this joint Federal-state commission, or whatever was being proposed.

I think the previous experience we have had working with the BLM and the U.S. Wildlife Service, who would have jurisdiction in this area, with the Corps of Engineers involved in the 404 process, is quite sufficient.

Let me move on with the development, quickly. After the gravel roads and pads were done, of course, the production facilities will be fabricated in the lower 48 and barged up. You are familiar with that technology.

Pipelines would be built, once the right-of-way was granted. And you are familiar with that technology. We think it is important that the Secretary have the authority to grant the right-of-way across the Federal lands.

Of course, the right-of-way over to Prudhoe Bay would need to go across state lands, and that is a separate right-of-way. But we think it would expedite the development if the Committee would delegate to the Secretary the ability to grant the right-of-way across the Federal portion of the 1002 area.

One of the big impacts that we have all had concerns about is the drilling activities and the waste created during the drilling of the wells. The largest volume, by far, of solid and liquid waste that needs to be disposed of results from the drilling operation.

And I have some exhibits that show what the current technology is. In the early days of Prudhoe Bay, the drilling liquids and solids were placed in the reserve, these gravel reserve pits, and they have been on trial throughout this whole debate.

What we are now doing at Kuparuk, and in exhibits two and three, you see, are graphical depictions of that technology. And if you look at exhibit two we separate the liquids from the solids.

And the solids are principally drill cuttings, rock chips that are removed from the hole during the drilling process, combined with naturally occurring clays and barites used in the drilling muds.

These solids are conveyed over into a hole that is excavated into the permafrost at a depth of five to 10 feet, the material that is taken out of the hole is stockpiled. The muds and cutting solids are conveyed into that hole.

The liquids are injected down the annulus of one of the wells on the pad that had just been drilled. And the annulus is that area between two strings of pipe in a well more fully defined in the written testimony.

At the end of the day, when the drilling on that particular pad ceases, the cap is placed over the pit. It is rounded and reseated. And the dry solids and cuttings are allowed to freeze back, since they are below the elevation of the permafrost, or below the depth of a permafrost. And they essentially are encapsulated by freezing and remain at that location.

We envision the same technology, we are doing this right now today at Kuparuk. Unfortunately, we are not doing it at Prudhoe Bay because we are not building new drill sites at Prudhoe. But we are doing it at Kuparuk and we will continue to do so.

If you look at this next exhibit, four, this is an artist's rendering of what this technology might look like, just to give you a visual effect, of what this technology might look like at ANWR.

What you see is a drill pad, and again it is totally hypothetical. But it shows the drilling rig. The brown areas at the bottom of the picture depict the hole in the tundra and depict the stockpiled portions of the material that was removed from that hole.

On the other side of the drill site, you will see two lighter green areas, and those represent the reseated, rehabilitated cutting storage area. Now, this activity only persists while the wells are being drilled, which takes maybe one or two years to drill up a pad.

Exhibit five shows what the drill site would look like the majority of its life. There is no drilling activity, there is no open reserve pits, there is no impact or lasting impact on the environment.

At the end of the day, if you will look at exhibit six, at the end of the life of the oil field, it is a fairly simple matter to plug and abandon the wells, remove the facilities, and reseed the whole drill site. And over time it becomes more and more a part of the natural landscape.

The CHAIRMAN. Could we write this into the legislation?

Mr. WEEKS. No, I am making a point about solids disposal. And the current practice——

The CHAIRMAN. Well, the Committee has decided by two to one that we want to try to report legislation, and we are trying to decide now what to put in it.

How does this relate to what we put in the legislation?

Mr. WEEKS. Okay, Mr. Chairman, the point I want to make is, current regulations are in effect that cover this. And the point I want to make is you should put nothing in the legislation except reference to current regulations.

The last point I want to make is about the duplication of facilities, particularly in the support area. If you go to the last exhibit, it is a large air photo of ANWR, I will give Mark a minute to put it up there.

We do not see the need for a duplicate of the Deadhorse area. For those who do not know, Deadhorse is a service area south of Prudhoe Bay. We envision the majority of the needs for the drilling of the wells, and the initial development of ANWR, can be satisfied from Deadhorse.

There will be need for more permanent service bases, or base, in ANWR. We envision the concept that would be most appropriate for those would be the park industrial center type concept, which is a North Slope Borough-owned, Native operated support base in the Kuparuk area, available to lease to all the service companies and contractors in that area.

What you see on the last exhibit is the same prospect 19. I have also shown prospect six, which is a smaller one. It could be developed on only two drill sites, less impact.

The point I want to make with this is, the key to achieving Kuparuk industrial center type activities in ANWR, the key to coordinated and consolidated planning for the development of all of ANWR is to make it all available for lease at the same time.

It makes no sense to me to reserve a core calving area that does not get included in the plan anywhere, then later on we have to come back and duplicate those facilities because perhaps we could have done something different in developing prospect 19 that would have accommodated the core calving area later on.

But if it was excluded, that would not get into the planning process. Or if there was a hold on prospect six for some reason, and the pipeline was laid, the pipeline might not be big enough to get the oil in. So another line might be required.

So the point of all this, for the planning effort, I think it is important that the legislation provide for the making available of all the 1002 area for leasing.

The other point I want to emphasize, and Tom Cook brought it up, is we think it is extremely important that the Secretary have the authority and the ability to form and cause to be formed exploration and production units, the pooling of the resource for the most efficient conservation of both the surface and the subsurface resources.

There are eight oil companies that hold leases in the Kuparuk River unit, and there are 12 oil companies that have leases in Prudhoe Bay.

Can you imagine the chaos if all 12 of those guys were out there building camps and landing strips and trying to develop their own lease separately? Or all eight of those guys in Kuparuk were doing the same thing?

We think it is extremely important, from a conservation and environmental standpoint, that the Secretary have the authority. We think he has it now. But we need to make sure that he retains the authority to unitize the reservoirs in both the exploration and development phase.

The CHAIRMAN. To unitize, you say?

Mr. WEEKS. Yes, to cause to be unitized or allowed unitization.

The CHAIRMAN. You are talking about unitizing like at Deadhorse, or unitizing in the sense that we unitize the lease?

Mr. WEEKS. Unitizing the lease, which allows then for consolidation of the surface facilities necessary for all those leases.

With that, Mr. Chairman, I will conclude my remarks. And I think the panel will entertain questions.

[The prepared statement of Mr. Weeks follows. Attachments have been retained in committee files.]

WRITTEN STATEMENT OF JIM WEEKS
MANAGER, PRUDHOE BAY FIELD OPERATIONS
ARCO ALASKA, INC.

Thank you, Mr. Chairman, and distinguished members of the U. S. Senate Committee on Energy and Natural Resources.

Good morning. I am Jim Weeks, Manager of the Prudhoe Bay Field Operations for ARCO Alaska, Inc., with offices located at 700 "G" Street in Anchorage, Alaska.

This morning I would like to share with you my knowledge and experience regarding oil and gas development on the North Slope of Alaska. My perspective is rather unique as I have been involved in the development and operation of North Slope fields since 1973. I spent four years with the Engineering group that designed the original Prudhoe Bay production facilities and pipelines, and five years as project manager overseeing the design of facilities for the Kuparuk River Field, during which time many technological and environmental advances in the design and operation of our facilities were accomplished. For the last three years I managed field operations for the Kuparuk River Oil Field. My current responsibility is to manage the ARCO operated portion of the Prudhoe Bay and Lisburne Fields. These fields, two of which rank as the largest oil fields in North

America, are prime examples of well developed maturing oil developments. Progressive successes in safely developing Prudhoe, Kuparuk and Lisburne clearly justify firm support for the Department of the Interior's recommendation to conduct an orderly oil and gas leasing program for the Section 1002 area of ANWR.

My objective today is to help you gain an appreciation for the appearance and operation of potential oil fields in the 1002 area. During this effort, I will discuss the development sequencing and how improvements in technological, environmental, and operational practices within the Prudhoe, Kuparuk and Lisburne developments will be applied to ANWR.

Please keep in mind that my discussion and depiction of potential oil fields is purely and strictly hypothetical. The Legislative Environmental Impact Statement (LEIS) identified (26) twenty-six prospects for oil and gas development within the one and one-half million-acre 1002 area. My discussion will focus on LEIS Prospect 6 in the Marsh Creek area and Prospect 19 in the vicinity of the Niquanak River as depicted on page (55) fifty-five of the LEIS (Attachment 1). These prospects were chosen to represent both an intermediate and large field development at different locations in the 1002 area.

For discussion purposes I have assumed that these prospects have been delineated and proven to contain commercial quantities of oil and gas. Attachment 2 depicts viable production facility sitings for both prospects. Facility requirements for Prospect 19 correlate with the conditional economically recoverable oil reserves of the (8) eight largest prospects as indicated in the bar graph on Page 57 of the LEIS report (Attachment 1). Accordingly, Prospect 19 is assumed to hold 3.25 billion barrels of recoverable oil. Reserve assumptions for Prospect 6 are purely arbitrary. I will assume Prospect 6 holds 500 million barrels of recoverable oil. Production from these two fields is assumed to be 810,000 BOPD and 125,000 BOPD respectively. Of course, development of actual prospects would require much more environmental, engineering, geotechnical, hydrological and geophysical study than my simple examples suggest (Attachment 3). We can assume that Prospect 19, the larger of the two, would be developed first, for super giant accumulations are needed to support the remote construction of the pipelines, access roads and the infrastructure that will then allow development of the smaller fields.

Further in my discussion, I will walk you through Attachments 4 and 5 which are larger scale depictions of the two conceptual oil fields. I will also show you artist renditions (Attachments 6, 7, and 8) of specific production facilities and how they would appear during the development, production, and rehabilitation phases. These artist renditions will provide the opportunity to discuss actual operation practices. The renditions can be contrasted to reality by viewing Attachment 9 which is an actual photo of the Niquanak area, and Attachments 10 and 11 which depict actual Prudhoe Bay facilities.

Although my discussion today is primarily limited to the development and production phases, it should be noted that state of the art exploration technologies would be employed such as ice pads and encapsulated reserve pits as depicted in Attachment 12, which provides an excellent contrast to gravel pads.

Let us first discuss the various events that would lead to the facility layouts in Attachment 2.

Once commercial quantities of oil have been discovered and delineated, and a decision has been made to proceed with development, the first activities would include conceptual engineering and field studies to establish a preliminary plan of development. These studies would include soils and hydrology studies, fish, bird and wildlife studies, baseline air and water quality studies, gravel and water availability studies, etc. All these studies would serve two purposes. First they are needed to assess the environmental impact of specific development plans, and second, they are needed to confirm the assumptions made during conceptual design to allow further definition of the development plan. These studies would probably require 2 to 3 years to complete. Once the studies were done, a plan of development prepared, and an environmental impact statement prepared and approved, development would proceed only after receipt of the necessary local, state and federal permits. The permitting process would probably require another (6) six months to (2) two years, barring significant controversy.

The first development activity would be the construction of ice roads to provide access into the area. These would be constructed in the winter time, either from Prudhoe or from the northern shore of ANWR. Fresh water for the ice roads could be obtained from numerous lakes in the area as you see on Attachment 4.

Once the ice road was completed, one or more gravel sources would be developed. The State of Alaska policies on gravel source development have evolved over the last (10) ten years. During early development of the Prudhoe Field, gravel was extracted from floodplains. Later, and at the preference of resource agencies, gravel resource development moved to upland and retired oxbows of rivers. Now that successful precedents have been established and with the more recent river floodplain mining techniques perfected, resource agencies are now reconsidering and recommending floodplain extraction.

North Slope exploration and development projects typically are introduced to the permitting community during "annual gravel conferences" sponsored by the oil companies. This process offers the permitting agencies the benefit of previewing projects prior to submittal of permit applications. Significant environmental issues are identified and informal permit mitigation occurs, although further review continues during the public comment period. These comprehensive planning efforts have produced widely accepted mitigative techniques such as: locating mine sites near an active stream so the stream can be diverted to flood the borrow pit at abandonment or, fertilizing and seeding the excavated overburden from a borrow pit. During overburden removal at the most recent Kuparuk mine site, the top two feet of overburden was separately stockpiled for future backfill, fertilization, and seeding. It is sometimes possible to use the overburden material in the construction of gravel pads. When this is the case, two to three feet of overburden is initially placed, covered with a filter fabric and then capped with two to three feet of gravel. This method, used extensively at Kuparuk, not only beneficially uses the overburden, but conserves gravel as well.

All these measures, beneficial to both industry and the regulatory agencies, arose from annual gravel conferences, a benchmark practice that will most likely be preferred in ANWR.

For this hypothetical example, I've assumed that the gravel would be obtained from borrow pits adjacent to streams, as shown as elongated rectangles on Attachment 4. The important consideration is that after the pits are depleted of gravel, or no longer needed, they would be flooded with water, thereby enhancing fish over wintering and waterfowl habitat.

Based on our experience on the North Slope, it is safe to say that less than 1% of the surface area within Prospect 19 would be impacted by the placement of gravel and development of gravel sources.

The pads for the construction camp, the road and port, airstrip, as well as the gravel road to Pump Station 1 of the Trans Alaska Pipeline System, would be constructed next. The pads and roads would be elevated several feet above the tundra to insulate the permafrost from thawing and subsiding. Depending upon the soil conditions, less than the traditional five feet of gravel fill may be needed in ANWR.

After the main road network is in, the next order of business would be to construct living quarters for use during construction of the field facilities and pipelines. Water supply for the camp and drilling operations could either be from a flooded gravel pit, deepened lake, a shallow water source below the base of the permafrost, or from melted snow accumulated by snow fences.

After camp construction, production facilities and pipelines would be built. Most of the oil and gas processing facilities would, no doubt, be fabricated at one of several locations in the Lower 48 states. These large units would then be moved to the North Slope on ocean-going barges during the six to eight-week summer open-water season. The barges would be towed to the port, the modules unloaded, hauled overland and set on pre-installed pilings, interconnected, and made ready to receive oil and gas. From the start of design, until the modules are set in place, would take three years at the earliest. While these production facilities were being fabricated, field pipelines and a trunk pipeline to the Trans Alaska Pipeline would be constructed. The construction technique would, no doubt, be similar to those techniques proven reliable at

Prudhoe, Kuparuk and Lisburne. These would normally be elevated pipelines supported a minimum five feet above the tundra, although it may be possible to bury portions of the pipeline in ANWR, depending upon the characteristics of the soils in the various locations. Whether or not a separate construction road would be needed would be a detail that would wait further study, but conceivably the main access road or an ice road could be used to construct the pipeline. A pipeline constructed in the winter time from an ice road allows wider separation of roads and pipelines and further enhances caribou crossings. Attachment 13 traces the evolution of pipeline construction techniques in the Arctic. At Prudhoe the original pipelines were constructed adjacent to a construction pad, which allowed construction of the pipeline during the warmer summer months. Separate roads were built for normal vehicle traffic to and from the wells and facilities. The pipelines were fairly close to the ground, and gravel ramps were constructed over the pipelines to allow for caribou migration.

At Kuparuk, the separate pipeline construction pad was eliminated, and the pipelines were placed 25 feet from the main roads. Pipelines were also elevated a minimum of five feet above the tundra to enhance caribou migration (Attachment 14), since our experience at Prudhoe indicated ramps were not preferred. Advancements in pipeline construction techniques made it possible to construct pipelines in the winter from ice roads, thereby eliminating the need for the pipeline to be close to the gravel road. Pipelines on the Slope are now being elevated a minimum of five feet and separated by several hundred to a thousand feet from the roads. This concept allows virtually unimpeded movement of the caribou under the pipeline year round.

At the same time the trunk line is being constructed, in-field pipelines would be built in much the same manner. These lines would deliver oil and gas from the wells to the production facilities for processing.

The next major activity would be the drilling of enough wells to startup the oil field at the rate desired. The plan to be used for drilling would be to directionally drill wells from the compact drill sites. This concept is depicted on Attachment 15. When we first pioneered the design of production facilities at Prudhoe, there was very little operating history or understanding of what would work best on the North Slope, so the approach was conservative. For instance, wells were spaced 120 feet or more apart so that the derrick of a conventional rig could be laid down without obstructing the next well (Attachment 16). Since it is environmentally and economically prudent to locate wells in clusters to minimize the amount of gravel used in pads, this concept required a long narrow drill site to accommodate the necessary wells to develop the reserves. The natural thing to do to handle the drilling muds and the cuttings removed from the hole was to construct a gravel reserve pit area adjacent to the drill pad, in which these muds and cuttings were impounded.

Technological advances made since this initial concept have enabled us to initially develop Kuparuk with wells on 60 foot spacing. From an environmental standpoint, this means that there is less gravel placed on the tundra, smaller reserve pits for muds and cuttings, and less impact. We've drilled over 1,000 wells at Kuparuk, Prudhoe, and Lisburne and the drilling rig technology has further progressed to a point where we are now drilling wells on 25 foot centers, using a rig designed such that only the derrick, rather than the entire rig, is cantilevered over the well. Attachment 17 shows actual photographs of this evolution.

At Prudhoe, the reserve pits are large enough to hold the cuttings and liquid mud from all the wells anticipated to be drilled on the pad. We have subsequently developed mud systems and solid control techniques so that fluids are separated from the solids and injected into the annulus of one of the wells on the pad, therefore, reserve pits are only required for the solids -- principally cuttings removed from the hole and natural occurring clays and barite used in the mud systems. Attachment 18 is a vivid comparison of original reserve pits at Prudhoe, Lisburne, and Kuparuk.

These techniques will be further refined in ANWR. The reserve pit technology that we have developed at Kuparuk as shown on Attachments 19 and 20 results in the permafrost being excavated to a depth of five to ten feet into the frozen material. The material that is removed is stockpiled adjacent to the hole. Throughout the drilling operation cuttings and mud solids removed from the well are placed into this hole. Fluids from the drilling mud are injected down the annulus of a well on the pad. The annulus is that area in a well between two strings of casing and is illustrated on Attachment 21, a conceptual drawing of how disposal of fluids generated through the drilling process is accomplished. A large hole is drilled to a competent formation and surface casing is run and cemented to the surface. The well is deepened, and a production casing is run and cemented up to a depth to isolate other producing formations. The drilling fluids are then injected in the annular space between the surface and the production casing and remain in the salt water aquifers well below the permafrost at a depth of two to four thousand feet where there is no chance they could contaminate any drinking water source or return to the surface. This technique has worked well at Prudhoe, Kuparuk and Lisburne and will no doubt work well at ANWR.

For the size oil field assumed as Prospect 19, it would be necessary to construct 13 drill sites, each with approximately 60 wells. Each of these drill sites would require about 60 acres of land. To help visualize the impact of the development phase refer to Attachment 6. Once a row of wells on a pad is drilled, the material that was previously removed from the excavated hole in the permafrost would be placed back over the mud solids and drill cuttings and frozen back into place through the natural processes at work on the North Slope. Thus, the drill cuttings and mud solids would be encapsulated by freezing and would remain at that location. If it is necessary to come back to the drill site and drill more wells, it would be simply a matter of excavating an extension to the hole, placing the mud solids and drill cuttings into that hole and backfilling with the native material in the manner as shown on Attachment 6. For the majority of the life of the oil field, the drill site would appear as shown on Attachment 7 with no rig in place and no active reserve pits. At the end of the life of the field, it would be rather a simple matter to plug and abandon the wells, placing cement plugs across all producing intervals, fresh water formations, and at the surface. The surface facilities would be removed, the mounds that were created as a result of cuttings disposal would be reseeded, and over time would gradually assume the shape and characteristic of their native surroundings, as depicted on Attachment 8, an artist's rendering of the drill site 5 to 10 years after abandonment.

In the hypothetical Prospect 19, there would be two oil processing facilities as shown, one port facility, and one airstrip. If it is necessary to waterflood the oil reservoir later in its life, the water depth at the location of the port facility is sufficient to allow a sea water treatment plant to be constructed. At the location shown, the water depth is 24 feet, whereas at Prudhoe Bay it was necessary to build a causeway 3 miles out into the open sea to get to 12 feet of water. Attachment 10 is a photograph of one of the existing production facilities on the North Slope. Facilities on Prospect 19 would no doubt resemble these.

-Let us now move to a smaller prospect, and I've selected Prospect 6 out of the Department of Interior report, to show what a smaller development might look like. This development is shown on Attachment 5. It requires only two drill sites and one production facility. The concept would be very much the same as for Prospect 19. A pipeline would connect production from this facility to the main trunk line between Prospect 19 and the Trans Alaska Pipeline System. Surface impact on this field would be even less than the surface impact from Prospect 19 because of only two drill sites and one production facility. If it is necessary to waterflood this oil field, the near shore water depths just to the North in Camden Bay are 18 feet so it would be very simple to place a seawater treatment plant at that location without having to construct a causeway out into the Beaufort Sea.

It would not be necessary to build a large support base to support the drilling and production activities in ANWR since a major support base already exists south of Prudhoe Bay in an area known as Deadhorse, a photograph of which is shown on Attachment 22. The Deadhorse area is capable of serving a large percentage of the needs for the development of ANWR. The only temporary type facilities would be those required for construction of the pipeline and the production facilities. Permanent facilities for support contractors and service companies would conceptually be similar to the satellite support base, The Kuparuk Industrial Center. This is a North Slope Borough owned, native corporation operated support base that is available for lease to all service companies and contractors serving the Kuparuk River oil field, and is shown on Attachment 23. This concept avoids the sprawling duplication and development that has occurred at Deadhorse and would conform to North Slope Borough zoning requirements.

Attachment 2 is a large aerial photograph of the entire 1002 area. Please note the 1002 area is outlined by the white border on the large photograph and it is the area north of the Sadlerochit Mountains on the Coastal Plain of the Arctic National Wildlife Refuge. The roads, pads and facilities shown on Attachment 2 are the same ones just described for the hypothetical development of Prospects 19 and 6, and the routing of the road and pipeline is that suggested in the Interior Department's 1002 report. It is noteworthy that, though hard to see, the depictions are to scale and in an overall sense, the visual and land use impacts of these developments are vanishingly small.

Those opposed to ANWR leasing have stated that the real issues are land use and visualization. Through the exhibits attached to this testimony, I hope you can visualize how unobtrusive oil development is on the Arctic coastal landscape, a landscape that is available for viewing the few months of the year it is not snow covered and dark. I hope you can visualize that in the longer term, after abandonment and restoration, there will be practically no impact.

The other issue is land use. The Coastal Plain comprises 8% of the Arctic National Wildlife Refuge. If the entire 1002 area were commercially productive, which is extremely unlikely, less than 1% of it would be impacted by oil development. This means that less than one tenth of 1% of the total ANWR area would be impacted by development of what potentially could be 20% to 25% of the entire nation's domestic production. Another way of expressing this would be that the total area impacted by development would equate to an 11 square mile area, or an area less than the size of Dulles International Airport.

We recognize the environmental sensitivities in this area. Indeed we as an industry have performed remarkably for over a decade in a nearly identical environment 65 miles to the west at Prudhoe Bay. Today I have attempted to show industry's progressive improvements in oil development on the North Slope. Through my hypothetical examples I have attempted to depict development of the coastal plain of ANWR as recommended by the Department of Interior. The bottom line is that the rewards of a successful development will be of enormous value to our nation's economic and security interests, while the impacts are discreet and highly manageable. We strongly recommend this committee support the DOI recommendation.

The **Chairman**. Thank you very much, Mr. Weeks. Gentlemen, my own view is that this legislation should maximize environmental protection, should minimize delay, and in that respect, for example, I believe that the programmatic EIS already done should be deemed sufficient for commencing the leasing program.

To do otherwise would give you a delay without an important breakthrough. I mean, without an important protection of the EIS.

On the other hand, I wonder, for example, about this statement that the whole area must be leased at once. Now, you obviously do not mean that the whole 1002 area be put up in one gigantic lease sale at the same time, do you?

Mr. **LaGarde**. Yes, sir.

The **Chairman**. Do you think that the whole area could be explored simultaneously?

Mr. **Herrera**. Mr. Chairman, can I comment on that? What companies bid on is a function of the geology. It is not just a function of the number of acres available.

And if the whole of the 1.5 million acres were put up for lease, the only areas which would actually receive bids would be those that were perceived to have some chance of having oil underneath them.

And you know, we all have the same sort of geological information from this area. If 50 percent of the area was bid on, I would be extraordinarily surprised. It is going to be less than that, probably.

So even if you open up the whole of the 1.5 million acres to leasing, only perhaps between 40 percent and a maximum of 50 percent of it would ever receive bids for leases. Now, that is still quite a lot of acreage.

But presumably, part of the system of competitive bidding is to get multiple companies involved. Presumably, you might have 10 or 12 different companies owning those 700,000 leases, or thereabouts, 700,000 acres of leases.

However, when the leases started to run, the term of the leases started to run, hopefully a 10-year term, you have got to give us some encouragement, Mr. Chairman, you would not see a rush in there with dozens and dozens of rigs to drill those structures or those leases, simply because there are not dozens of rigs in existence that can operate in the Arctic.

There are very, very few. They are very specialized pieces of equipment. And if you had two or three in your first available drilling season after the permitting phase, I think you would probably be looking at the optimum. So it is going to be a make hay slowly proposition.

But the point is, if you want to find oil, you drill in what you perceive to be the best area first. Now, my best area is not the same as Mr. Cook's necessarily. But we both like the opportunity.

The **Chairman**. I understand that. But it just seems, I mean, we do not lease out in the Gulf of Mexico, the entire Gulf, all at one time. We do it in phases.

And I understand that you must have a great deal of discovery there in order to justify building the pipeline and building the development. I understand that. But the idea that we would just put the whole 1.5 million acres up at one time necessarily does not seem consistent to me with good environmental protection.

Let me give you a proposition here and ask you what is wrong with this. Suppose that you say that the core calving areas may be leased, provided first that they are the last leased, second that they may not be leased until and unless there is a substantial discovery, however we want to define that, elsewhere, and third that there has not been any demonstration of adverse effects on the caribou from the activity up until that point.

What would be wrong with that kind of proposition? In other words, it would ensure that you could lease it later, provided you have already made a discovery, or maybe you would say that you could lease it now but not develop it later until and unless there was a discovery elsewhere, substantial discovery, and it could not be developed until everything else was developed. And finally that there would not be a demonstration of untoward effects.

I believe the record is probably sufficient to show that the chance of untoward effects would be not very great. But the mountains are closer to the sea here, and you might have some radical change in the migration patterns of the caribou or something.

But just to assure those, like the State of Alaska, who feel strongly that there should be no leasing, no development in the core calving areas, what would be wrong with that as a compromise?

Mr. HERRERA. There are a few practical problems. Leaving aside whether a core calving area exists, the first thing is that what you are proposing would result in eventually leasing the core calving area after only an exploration phase on the rest of the Coastal Plain.

Exploration is likely to be only in the wintertime; therefore, there will not be any effect on caribou. There will be no caribou there; therefore, you will have no idea of what the effect of drilling is on caribou before you propose to lease the core calving area.

There simply will not have been any summer activity, because summer activity is only to be expected, if you consider what I have said in my testimony, during the development production phase.

Production is not going to be for another 15 to 20 years, 15 years certainly, so are we going to wait 15 years before we open up the core calving area, which we know is overlying good geological structures?

A better solution, Mr. Chairman, I would suggest is to accept that the core calving area is something special. Lease it, though. Lease it early but only allow summer drilling in the core calving area, summer drilling with lots of controls and lots of scientific monitoring and studies.

The CHAIRMAN. Allow only summer drilling?

Mr. HERRERA. Yes, sir. The point is that is the only way you will know if there is any adverse effect on the caribou. If you have total control over that summer drilling, you can stop it at any time, and the lessee knows the risks it is taking when it bids on a lease in the core calving area.

At least that way you get the answer to your question, does activity affect the calving caribou or the caribou in that area. Otherwise, you will never get that answer; therefore, you will never lease the core calving area.

The **Chairman**. Should you have any drilling in the core calving areas unless you know that there is substantial discovery elsewhere?

Mr. **Herrera**. Substantial discovery elsewhere, yes, sir. I do not think we can afford to leave any major oil accumulation in the Coastal Plain in the ground. We have to look for all the accumulations we can because we need them all.

The **Chairman**. In other words, you would lease it last or you would develop it or explore it last? You are not going to be out there drilling holes all over 1.5 million acres simultaneously. You just said that you do not have enough of those drilling rigs.

Now, do you want to drill in the core calving areas first?

Mr. **Herrera**. Mr. Chairman, my point is that leasing it last is not going to enhance the protection of that area. In fact, it would probably do the opposite. You will have no better information on the effects on caribou leasing in 15 years time than you do today. We have very good information today from Kuparuk.

The **Chairman**. We might not necessarily have all the exploration drilling, as you suggest, in the wintertime.

Mr. **Herrera**. In that case, why not have the exploration drilling where the pregnant caribou are to see the exact effect on those pregnant caribou? At least you know then. You will be certain, and you can say no, we are not going to lease this area because that drilling rig frightened the caribou.

If the drilling rig did not frighten the caribou, then you have peace of mind thereafter.

The **Chairman**. In your view, is that the hottest area in the whole 1002 area?

Mr. **Herrera**. I do not know, Mr. Chairman. I am sorry. I wish I did.

The **Chairman**. You can tell us if you want.

Senator **Ford**. Let us hear from some of these other fellows.

The **Chairman**. I know you know the results of that well.

Mr. **LaGarde**. I would be interested in hearing from him, too, on that, Mr. Chairman.

I would like to follow up a little bit on that. The fact is that in the Gulf of Mexico, for instance, we do have leasing. We put everything up for lease, but market determines where those leases are taken.

The same thing could happen in the 1002 area.

The **Chairman**. You are telling me that the entire Gulf was leased in one giant lease sale?

Mr. **LaGarde**. Yes, sir, but there are 94 million acres in the Gulf of Mexico that are up for lease, and we broke it into three portions. So 30 million acres is handled at one time roughly. We put up 30 million acres, and every available tract that is in there has the possibility of having a bid dropped on it.

Then the Secretary of Interior has the discretion at that time to determine whether or not those bids are acceptable, whether they will return fair market value. The same kind of process could take place in the 1002 area. We would have 1.5 million acres, 30 times less than what we do in the central Gulf of Mexico, for instance, and allow companies to bid what their economics tells them to bid, whether or not it is in the core calving area or the so-called core calving area.

The **Chairman**. What do you think about Mr. Herrera's suggestion that we allow a little drilling there in the summertime to give us a baseline of information before further drilling could proceed?

Mr. **LaGarde**. I think that would be interesting. I think we would support drilling in the summertime, but it could probably be done well in the wintertime when there is nothing there. It would give us a good baseline if we really wanted it.

We think that the evidence shows very clearly at Milne Point, Kuparuk and elsewhere that the caribou are not going to be affected by our activities in that area.

The **Chairman**. You would be willing to have a contingent test; that is, some kind of initial drilling in the summertime and then you look at the results of that to determine whether you can proceed further to develop?

Mr. **LaGarde**. In the core calving area? It would be an interesting concept.

The **Chairman**. One more question, Mr. Herrera. You suggest that we have this summer drilling after an initial discovery of, say, 3,000 barrels a day or however we define it.

Now, with respect to your NEPA process, would you then require the operator to initially describe in his NEPA application how he would develop the entire thing, or would you put limitations on development wells? How would it work?

Mr. **Herrera**. Mr. Chairman, the NEPA process has really kicked off as far as the environmental impact statement is concerned. When the question of commerciality has been established, it is then that the operator puts in his permit application to develop that oil field. Certainly at that time he has to sort of put all his plans out on paper, everything, to the minutest detail.

Before that, there is permitting for every individual well after the discovery delineation wells, and that permitting in fact requires all the details of the operation, which are judged on their merits before the permit is issued for an individual well.

The **Chairman**. When he seeks his permit for his initial exploration well, he does an EIS. What would that EIS cover?

Mr. **Herrera**. A lease sale might require a full-scale EIS. An exploration well after the lease sale would probably not be determined to be a major Federal action and would not require an EIS. It would just require an environmental assessment, which is a much shorter document.

The **Chairman**. Yes, but you are going from winter to summer. Surely that would be a major Federal action to have a development well, would it not, as opposed to just an exploration well in the winter?

Mr. **Herrera**. I would argue that it would not. If it was a summer well in the middle of the calving caribou, however, then yes; but a summer well elsewhere where no known wildlife activity was expected of concern should not require a full-scale EIS.

The **Chairman**. Are you saying that NEPA would have to be expanded or modified in that respect, or would you be willing to take your chances with the NEPA law as it is?

Mr. **Herrera**. Absolutely. I think it covers it more than adequately.

The **Chairman**. I think my time is up.

Senator Wallop.

Senator **Wallop**. Thank you, Mr. Chairman. Let me begin with an observation that the total acreage of lease sales in the Gulf for a decade or more have exceeded 1 million acres on average.

Mr. **LaGarde**. By about 30 times in one planning area.

Senator **Wallop**. I am talking two leases here if that were to be followed in the same pattern. I would have no particular objection to that.

Let me ask you this. If the recommendation is that we go to the development phase and permit summer drilling, why would we not permit summer drilling in the exploratory phase? If it is going to be all right and safe once you get to development, why would it not be all right and safe just to go ahead and do that and rely on the process to be responsive, as you say it is and I believe it to be?

One of the things that worries me about getting a whole lot of specificity in this legislation and by omitting some things that we probably would have liked to have included it seems to me, that the process is alive and it changes with knowledge and circumstances.

Mr. **Herrera**. Senator, there is no reason why summer drilling should not be allowed, so long as it can be shown to be protective of the environment and not harmful to our life. Obviously, that is a caveat which is very important.

Most operators, however, would preferentially choose to drill their exploration wells in the wintertime because, believe it or not, it is cheaper to drill in the wintertime than the summer.

You have this incentive of discovery which enables you to spend more money on these summer wells. The exploration phase is probably better to drill in the wintertime.

Senator **Wallop**. I guess that is still an answer to my question. The marketplace drives behavior in there, and behavior happens to be in line, but people ought to be able to choose that.

If they can demonstrate that at any time it is going to be safe, then they ought to be able to make their decisions based on economic necessity. Having satisfied the wildlife and environmental concerns, thereafter those decisions ought to be left to the operators.

Mr. **Weeks**. Senator, I think there is another consideration. If it is the first well you drill in an area, it is just not practical to expect to open a gravel source, mine the gravel and build a road to allow summer drilling. If it is one of a series of wells in an area where there already is an infrastructure in place——

Senator **Wallop**. I do not quarrel with that. If the habit and behavior is that that is what they do, that is what they will do. It is permissive, not mandatory, that you drill in the summer in either instance.

All I am suggesting is that if the wildlife and environmental concerns can be satisfied, then it ought to be the call of the operators. If they cannot be satisfied, then there is no call to make. Until they can be, there should be no consideration.

I guess from my own perspective, I will be silent on it and pay more attention to the environmental concern and let you do the business decisions underneath that concern. Make certain that that is satisfied, and then you do what is responsive.

Let me say that on November 4 the Office of Technology Assessment will hold a workshop in Anchorage. The purposes of the workshop will be: One, to explore the status of technology for arctic oil and gas exploration and production that might be used in ANWR if such activities are permitted;

Two, to discuss technologies and practices that have been developed in the past 15 years of Alaskan oil production and to explore new technologies needed that are likely to be developed for future arctic oil production; and

Three, to review the status of technologies which have significant impacts associated with their use.

OTA will invite a group of participants who have special or expert knowledge of one or more significant aspects of arctic oil and gas technology.

The group will include people from diverse interests as much as possible. The group will be mainly Alaskan based.

Another workshop is planned in the lower 48.

OTA has developed a list of questions that I think will help our deliberations here in this Committee, and we need to get a headstart and not wait for November 4.

So I will submit these questions. There are 17, and if you all could respond to those, that would give us as leg up in our deliberations. We will not have to wait for them to hold that workshop and then go on through their processes. I presume the answers would be the same in one set of circumstances as the other.

So, Mr. Chairman, if I may, I would like to ask this panel of witnesses if they would respond to these questions. Thank you very much. I appreciate it.

Mr. **LaGarde**. We will be happy to respond to that.

Senator **Wallop**. Thank you.

The **Chairman**. Senator Nickles, I believe, was next.

Senator **Nickles**. Mr. Chairman, thank you. I was going to follow up on Senator Wallop.

Mr. Herrera, when you mentioned that you would like to have some flexibility to continue production during the summer months, I thought that made sense, and then I was going to ask myself why not the exploratory.

Let me ask you a question. When you have an exploratory well, if you have a find, is that usually your determination where you would build your platform? Are you thinking that once you build your platform you want to be able to do all your directional drilling, et cetera, year round?

Mr. **Herrera**. No, Senator. You usually do not do that until the latest date, until the production stage.

Obviously, if you have a platform in existence from which you have been lucky enough to drill a discovery well, you have the option of drilling a second well from that same location, which saves building a second location. If the geology allows you to do that, you would preferentially do it.

Delineation phases are fraught with question marks, and you never what you are going to find; therefore, you do not like creating permanent or semi-permanent facilities. You leave that until you are sure that you have a produceable oil field, and then you can put down gravel pads and so on which will be used for the next 50 years.

Senator NICKLES. What is the number of miles from the center of the core area from ANWR to the Prudhoe Bay Pipeline or Alaskan Pipeline?

Mr. WEEKS. About 100 miles from the midpoint to the taps.

Senator NICKLES. Is the Alaska Oil Pipeline a 42 inch?

Mr. WEEKS. Forty-eight inch.

Senator NICKLES. What kind of diameter of pipeline would you probably be looking at to connect a forty-eight inch pipeline?

Mr. WEEKS. That would be extremely difficult to tell.

Senator NICKLES. What kind of volumes are you looking at?

Mr. WEEKS. Thirty to 40 to 48. Volumes would determine it.

Senator NICKLES. I mentioned in my statement the probable decline of the Prudhoe Bay area. I mentioned Prudhoe Bay, but I was including Endicott and other areas of daily production at about 2 million barrels per day. Is that accurate?

Mr. WEEKS. Yes, sir.

Senator NICKLES. Prudhoe Bay is about 1.8, and then the others, combined, about 2 million barrels per day. Is that accurate?

Mr. WEEKS. Prudhoe Bay is not quite 1.8. With volumes, NTLs and condensated, it is about a little under 1.7, 1.65. I do not think it is close to 2.

Senator NICKLES. Was I close to correct in saying that the projected decline of the Prudhoe Bay area, would, by the year 2000, in other words, 12 years from now, be to about 600,000 barrels per day?

Mr. WEEKS. Yes, sir.

Senator NICKLES. Is it anticipated or hoped that the amount of production from the ANWR area would be able to fill in that differential if we are somewhat successful? I know that guesstimates have bounced around, but if we were enormously successful could we keep that production coming from the northern slope, ANWR and the Prudhoe Bay area at 2 million barrels per day for some period of time?

Mr. WEEKS. I see nothing, no scenario around ANWR that is going to fill that valley that is going to be created in the next two or three years when Prudhoe starts on decline until volumes come from ANWR.

The odds are no volumes will come from ANWR. We are not sure. We are not sure what the volumes might be. There is nothing on any scenario I have seen that it is going to fill that void.

Senator NICKLES. Let me rephrase that. If we were quite successful in the ANWR area, could we optimistically hope for 1.4 million barrels per day by the year 2000?

Mr. WEEKS. I think 2000 is too early a time frame. You might expect or hope to have those volumes. I think the timing is off.

Senator NICKLES. Can we as legislators do different things? I, for one, am very concerned because I think you heard in my opening statement that I thought that we would be importing 60-plus percent by the year 1995. Extrapolate that out to the year 2000, and my guess would be that we will be importing 70-plus percent by the year 2000.

We are going to be a very, very hungry nation for secured supplies by the year 1995, if not the year 1990. So can we do some things now in the authorizing legislation that would help expedite and reduce the number of years to reduce that void, reduce that valley as you have described it, so that we can at least hope for continuity or continued flow of at least 2 million barrels per day?

Mr. WEEKS. I think so. You can declare the Legislative Environmental Impact Statement sufficient, as suggested.

Senator NICKLES. Is that in the legislation now, or do we need some additional legislation? Do we need to take some of the language out that deals with environmental concerns and just say existing environmental impact statements and procedures are adequate?

Mr. WEEKS. I think the bill is clear. EPA thought it was a little vague. I think the vagueness needs to be removed from the Murkowski Bill and allow existing mechanisms that are in place to continue to be in place and not create new regulatory mechanisms. That is one area.

Giving the Secretary the right-of-way authority is another area. Perhaps there could even be some expedited legal process somehow.

Senator NICKLES. You mentioned the Secretary having expedited right-of-way authority. Does he not have that now, even on Federal lands?

Mr. WEEKS. I do not know the answer to that. This came up yesterday in Secretary Horn's conversation. Whether or not he does, I really do not know at this time.

Senator NICKLES. Correct me if I am wrong, but I would have thought that those lands are under the control of the Department of the Interior, and I would think that the Secretary could give that right-of-way if we would enact this legislation. So maybe that will be something we will pursue.

Mr. WEEKS. That was one of the stumbling blocks when TAPS was authorized, I remember.

Senator NICKLES. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

I am wondering if we could again explore your collective attitudes with regard to the NEPA process inasmuch as there is a significant potential threat for substantial delays just in the very nature of NEPA.

I happen to believe, Mr. Chairman, that in the not-too-distant future this committee is going to be sitting on the subject of an energy crisis, an oil crisis, and is going to have a gallery full of consumer groups advocating that we expedite for the benefit of the consumers and the price structure whatever energy we can hopefully bring to market with regard to hydrocarbons, particularly crude oil.

The specific concern I have is that Congress from time to time by a specific direction, legislative direction, would, say, require EPA to develop a list of toxic substances. Maybe EPA does not do it.

It extends for a period of time, and then Congress begins to set specific time levels, establish a time line that the list must be developed within a specific period of time so that action can be taken.

I am wondering, in view of the discussion that we have had on NEPA and the process, is it your individual or collective opinion that this legislation should reflect a congressional mandate to expedite the process?

We have already heard testimony that we are well into the year 2000 before we can expect this to be commercial.

You have observed, I think, the feeling among the committee members that there is question of whether you put it all up for lease at once or portions. If you put up portions, why, then, the NEPA process is applicable to each one.

So my first question, gentlemen, is do you feel that as a consequence of the significance of what this potentially could mean if there are major discoveries that we should attempt to structure in the legislation specific time frames for delivery of the NEPA intent or process but, rather than just leave it open end, mandate that there be time frames?

Mr. **Cook**. I think the most protracted delays under the NEPA process are the lawsuits. These go on for years and years. I think perhaps the greatest opportunity would be for some prescribed timetable for judicial review so that these do not drag on for years.

I guess I would have to drop it at that because I am not an attorney. I am not sure just how that would work, but that would seem to have some merit.

Senator **Murkowski**. What we are attempting to do is to move the process along without necessarily doing any environmental damage in the sense of overlooking the process, but by the same token we have a critical reality on our hands if, indeed, we can believe that we are going to be importing 50 percent of our crude oil by the year 2000. I think it will be before that.

Would anybody else care to address whether in this legislation there should be some specific time frame such as we have seen in the environmental legislation which mandates certain specific things and then if they do not come, we put in time requirements for them to appear?

Mr. **Herrera**. Senator, I think the biggest saving along the lines that you are suggesting can be made by using the existing process to satisfy the first stage prior to a lease sale, which you already have in your legislation, in your bill. That can save, as we heard from Mr. Horn yesterday, at least 12 months.

Thereafter, I do not think that subsequent lease sales should be absolved from the NEPA process at all. Perhaps they take place every two, three or four years, but there is plenty of time to go through NEPA, and there is no reason to quicken that process so long as it is done in a reasonable fashion, which it is.

Now, the NEPA process next comes into fore as a time consumer after a permit application for development, and that usually burns up about three years. Whether one should deliberately shorten that or not really is a questionable problem because, of course, that process does result in the environmental protection of the subsequent development, which is the thing we are all concerned about.

So, on the whole, while I do not like using three years for that process personally, I think perhaps we should tolerate it.

Senator MURKOWSKI. It is quite clear the intent of the panel is for the NEPA process to apply on the lease sale and not each lease. The question I think the Chairman has brought up is the appropriateness of whether it should all be leased or leased in portions. You have already discussed that.

It is your understanding the NEPA process applies to the collective leases, whatever is put up.

Another question which I think has been touched upon in the testimony yesterday and again today. It seems to me the whole issue of caribou, caribou calving, core calving, the 242,000 acres, is being left to this committee, somewhat, to try and wade through the merits of whether the caribou are easily displaced or whether there should be asimiles put up.

I would think that would be a situation which the State of Alaska and the industry and our people who are concerned specifically with the charge in the state. The Department of Environmental Conservation and others would want to try and work out before bringing it to this committee as to what is the logical sequence of events to try to address resolving of this.

I think if you leave this up to us, you are circumventing your knowledge and expertise to a committee that, while they do have great knowledge and expertise, lacks a little of the firsthand realities. I am specifically referring to the examples given yesterday that indicated that there really was not a firm state plan.

There was a state wish to withdraw this for seven years, but it left a lot to be desired as to get the specifics of what they were going to study, since it is obvious they did not know what was necessarily there on a parcel for the last several years. So, if you put something on it, is that the reason the caribou are there or are not there.

The whole thing leaves a lot to the imagination, and I am wondering if there is a practical way that you can get together and discuss the merits of summer leasing, to determine if you do a small development under rigid criteria where you could actually stop it, as I think Mr. Herrera has suggested. There have been others that I think have been drawn to the Chairman's consideration, and maybe that should be the first portion, at least, and the merits of that.

It seems to me that just by leaving it hanging without a collective effort to try internally within the industry and the state to address this issue, you are running an awful lot of risk of a congressional mandate that it will or will not or will be a gray area that will be out there for a long time.

Mr. COOK. Senator, I think Mr. Herrera's suggestion has a lot of merit. I was struck by the fact that the state's witness yesterday had no clear concept or proposal for what would be done during this seven-year period, and that clearly would take us nowhere toward solving this.

I think exploration and requiring that activity to occur in this calving area during the summer—it would be more costly for industry to conduct such operations. Nonetheless, that would allow us to observe without putting in a permanent facility how activities impact and affect the caribou.

So I would have to agree with Mr. Herrera that that suggestion has a lot of merit.

I would like to go back further to the proposal of the Chairman that perhaps this ought to be withheld and leased last pending discovery elsewhere.

One of the points I tried to make was that if you withhold large areas, you might preclude that very discovery that we are looking for, so I think that approach might solve two problems.

Senator MURKOWSKI. Mr. Chairman, I would encourage your consideration to try to urge the industry and the state and the environmental group to come to some collective recommendation on the core calving area process of summer leases, no summer leases, first lease, first in, first out or something, because I can see the risk of not leasing it and that being the area where a major discovery is possible.

Since it is an issue that is fraught with a great deal of concern, justifiably so, yet an awful lot of misinformation as well, this is a way to collectively recommend to this committee a series of alternatives so that we can logically understand them and expedite the process. I certainly have a difficult time understanding what the state specifically has in mind other than their general wish to withdraw 242,000 acres for a period of seven years.

I can visualize your situation regarding the advantage of putting it up for lease and then putting the restrictions on. Those who say the caribou are very easily displaced without any permanent damage probably have a point too.

The last question I have, Mr. Chairman, because I know you have a number of other witnesses, is if you could give the committee, and I know it is in this book, but a verbal description of the footprint comparison that might be on ANWR vis-a-vis other experience you have had. I assume you would compare it with Prudhoe Bay.

I understand there are new technologies that would be used. You have talked about gravel. You have talked about water.

An issue with which we are concerned and which I think a number of my colleagues who are looking at this issue feel very strongly about is what is left after a potential field, such as we hope is in ANWR, is brought on line and then exhausted? After that, what is the footprint?

Mr. WEEKS. Let me answer that point, Senator. At Prudhoe Bay, the footprint, so to speak, the impact, physical, gravel that is on the ground or gravel sources that have been developed, et cetera, is slightly over 2 percent of the surface area.

Due to all kinds of technological enhancements and improvements and evolutions over the years, that has been reduced at Kuparuk because of smaller drill pads, understanding the permafrost more, the ability to kick the whales out further and develop more from a smaller surface area, we can anticipate and say with reasonable confidence that there will be less than 1 percent of the surface area of any oil field; in other words, at prospect 19, less than 1 percent of that area above that geologic prospect would be impacted by the gravel footprint.

I might put that in perspective. Let us assume that the entire 1002 area is one big oil field, one gigantic oil field, probably the whole 1.5 million acres, and it was all developed. What I am saying is that 1 percent of the 1.5 million acres would be what was left or what was the footprint at the end of the day.

If somehow you could take a bulldozer and push all that gravel into one big pad, that big pad would be about 11 square miles or an area of maybe three miles by four miles. That 11 square mile area is 25 percent less than the size of Dulles International Airport

Senator MURKOWSKI. Thank you.

One other question with regard to Secretary Horn's testimony yesterday, I think you testified that the best standard for protecting fish and wildlife values in ANWR would be that of, and I think you used the words, "no unnecessary adverse effect".

I am interested in knowing from industry's point of view if that standard is a workable standard.

Mr. HERRERA. I will give you my opinion, Senator. Yes, I think so. As was ascertained yesterday, any standard has to be subjective, but from the viewpoint of those of us in the field that have to do the practical operations, I do not think we would have any difficulties in ascertaining that standard according to language used by Mr. Horn. I know it has not been proven, and it might have legal problems, but just from a practical viewpoint it seems to me to be quite acceptable.

Senator MURKOWSKI. Thank you, Mr. Chairman. I would certainly urge the industry and the state to try to work together to address the core calving area, because you are much more familiar and knowledgeable and have the capability to come up with a resolution than to have this committee dictate one to you.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Ford.

Senator FORD. Let me compliment the distinguished Senator from Alaska. He is finally getting around to the Jago River alternative, and that is what I discussed with the Governor earlier.

One other thing strikes me as I have listened to testimony and have heard that word used this morning. There is an assumption that this bill is going to pass, that we can get together and work it out and go right on down the road.

There will be some speed bumps before this is over with.

You know, we are back onto unnecessary adverse effects, and I found out yesterday that there is no definition of that.

Do you all have any definition of "unnecessary adverse effects"? We could not even have adverse effects. We could not even have reasonable effects. There was no definition of that out there anywhere. Maybe it is in the eye of the beholder, but I am not sure anybody understands unnecessary adverse effects.

Let me ask this question, Mr. Chairman, and I think I have no other questions to ask.

Any of you can answer this question. Does any of the waste that we have referred to this morning fall under the definition of toxic waste?

Mr. **Weeks**. The waste, Senator, that I described that comes from the drilling operation does not fall under that definition.

Senator **Ford**. Is that the exploration part, or is that under the finding and then the full-term drilling?

Mr. **Weeks**. Both.

Senator **Ford**. Well, let me ask you this. Are you sending any waste now from Prudhoe Bay to Chicago to have it incinerated?

Mr. **Weeks**. Yes, sir. The waste we are sending is manmade materials that we have shipped to the Slope. I was referring to the wastes that are generated and caused by the drilling operation.

Senator **Ford**. So you are taking waste from the drilling and sending it to Chicago and having it incinerated.

Mr. **Weeks**. That is waste from the operation.

Senator **Ford**. Now, Mr. Herrera, what are you doing with your waste from your drilling operations? I think you are sending it to Texas and having it incinerated there, are you not?

Mr. **Herrera**. Yes, Senator. We import about 300 barrels of materials which give rise to hazardous waste every year. We recycle as much of that and reuse it on the Slope, and a small proportion of it, something like 15 percent, is actually sent out to a hazardous waste disposal facility for treatment.

Senator **Ford**. Thank you, Mr. Chairman.

The **Chairman**. Senator Bradley.

Senator **Bradley**. Thank you very much, Mr. Chairman.

I would like to ask the panel, maybe Mr. Herrera as the lead, what toxins are produced in exploratory drilling?

Mr. **Herrera**. Senator, do you mean hazardous material as defined by Federal law? I do not think there are any.

Senator **Bradley**. None?

Mr. **Herrera**. None.

Senator **Bradley**. You would argue that none are produced?

Mr. **Herrera**. That is correct.

Senator **Bradley**. What about in developmental drilling?

Mr. **Herrera**. No, unless we use an oil-based mud. Occasionally it happens in specialized wells. Then that oil-based mud is treated as a hazardous waste.

With conventional generic muds, no, there is no hazardous waste produced.

Senator **Bradley**. Do you expect to use that kind of mud in developmental drilling?

Mr. **Herrera**. That is quite likely, yes. Specifically, one tends to use that sort of mud when one is attempting a large deviation of a well, perhaps even a horizontal well, which we would do because that would have environmental benefits.

Senator **Bradley**. So that you would be using hazardous materials in developmental drilling?

Mr. **Herrera**. Only very occasionally, but yes, it could happen.

Senator **Bradley**. Does anyone else want to comment on that?

Solid wastes that are generated at Prudhoe Bay, things like batteries, tires, styrofoam, things like that, what plans would the industry suggest to dispose of solid wastes in ANWR or in the Arctic generally?

Mr. **Weeks**. The solid wastes, Senator, that are a result of the operation at Prudhoe Bay are disposed of in a North Slope Borough-operated landfill. It is an abandoned mine site. The Borough landfills that material, nonhazardous solid wastes, in discussing our landfill on the Slope. I would see no reason that should not be the situation on the Slope for some time.

Senator **Bradley**. All of the solid waste would be deposited where?

Mr. **Weeks**. Nonhazardous solid wastes are deposited in a North Slope Borough-operated landfill at Prudhoe Bay.

Senator **Bradley**. You would suggest that that is where the solid wastes that would be accumulated in the ANWR area will be deposited?

Mr. **Weeks**. Yes, sir.

Senator **Bradley**. What requirements should be placed in the law with regard to solid waste?

Mr. **Weeks**. I think current law and current regulation is quite sufficient, Senator, to accommodate the needs of the North Slope in general. EPA has deferred to the Alaska Department of Environmental Conservation to develop solid hazardous waste regulations. The Alaska Department has regulations with which the EPA agrees, and there is no reason for me to believe that EPA should not adopt those same regulations for ANWR.

Senator **Bradley**. So the view of the panel is that there should be no specific requirements related to solid waste in the law?

Mr. **Weeks**. Because we think there are sufficient requirements in existing law.

Senator **Bradley**. In the 1002 report, there is reference made to the Coastal Plain as a center of wildlife activity. My question is, is there any area within the Coastal Plain where wilderness and wilderness values outweigh energy development potential, in your opinion?

Mr. **Weeks**. I think the issue is one the state suggested yesterday that fresh water springs be reserved for their value, and we agree with that. We think the subsurface should be leased, but certainly there should be some protection from surface disruption of those values.

We agree with the state's position on that.

Senator **Bradley**. Does anyone else have a comment about that? Is there anyplace in the area on the Coastal Plain where wilderness values outweigh energy potential?

Mr. Herrera?

Mr. **Herrera**. Senator, I would say no, but clearly that is a subjective opinion. Other people have put great value on the Sadlerochit Springs; therefore, let us put them off limits.

Specifically, though, one of the more important habitats on the Coastal Plain area, which is in short supply—it is about the only one that is in short supply—is overwintering in fish habitat, simply because most of the water freezes in the wintertime. Such habitats, therefore should be totally off limits to development or use.

I think that is a reasonable rule which we would totally accept.

Senator **Bradley**. Any others of the panel?

Mr. **Cook**. I would agree with the overwintering in fish habitat and the warm weather springs.

Senator **Bradley**. As a general rule, do you think that there should be higher environmental standards on a designated wildlife refuge than on other lands?

Mr. **Herrera**. No. We should protect all lands to the greatest ability that we have, and I think we do that. After a while, protection is the ultimate of which we are capable, and you cannot go beyond that. I think we should give that to all land.

Senator **Bradley**. So that all places on the Coastal Plain or in the wildlife refuge should be protected equally? There is no area which deserves more intense or special protection?

Mr. **Herrera**. Senator, in any area, whether it is in a wildlife refuge or not, some physical or biological features are afforded special protection, and those special features should be recognized in the Coastal Plain also.

Senator **Bradley**. Anybody else in the panel?

Mr. **LaGarde**. Many of those things, Senator, would be handled in the stipulations that came out in your lease form that you work with anytime you take a lease.

Senator **Bradley**. What I am getting at is what standards the Congress should use to determine which are more sensitive areas and what stipulations should we evaluate?

Mr. **LaGarde**. I would suggest that that is within the Secretary's authority and his responsibility to handle those things and should not be part of further legislation. We have a plethora of regulations that we conduct our operations on right now. They are in place, working well, and stringently enforced.

I have a pile of them here. I will not go through and list them all, but they exist now, and we operate under those restrictions and requirements right now. We think that they are appropriate. The Secretary will and has in the past exercised his authority to insure that those things were taken care of.

Senator **Bradley**. Okay, I would like to move on to another area. What costs are associated with reclaiming areas that have been developed by oil and gas? What areas in the Prudhoe Bay area have been reclaimed?

Mr. **Weeks**. Senator, there is very little at Prudhoe Bay that has been reclaimed to date because it is still all in use.

Senator **Bradley**. Right. I think we heard yesterday that the field would operate for 30 or 40 years, and then it would be reclaimed and returned to its pristine state. Was that the commitment?

Mr. **Weeks**. The commitment is by way of the state oil and gas leases and the contractual obligation industry has to restore the area to the satisfaction of the State of Alaska in the case of Prudhoe Bay and likely in the case of ANWR to the satisfaction of the Secretary.

What is going to satisfy the state has not been established because the issue is still in the future. It has not been addressed in any level of detail.

Senator **Bradley**. Does the industry have any bonding requirements now imposed by Federal monitoring agencies?

Mr. **Weeks**. We post a bond with the State of Alaska to cover our lease operations. It is not a large amount, about a quarter of a million dollars.

Senator **Bradley**. How much?

Mr. **Weeks**. About a quarter of a million dollars.

Senator **Bradley**. A quarter of a million dollars, yes.

Does anybody else want to comment about the bonding?

Mr. Herrera?

Mr. **Herrera**. No, that is my understanding of the situation. The bonds are required for any operations, but they are a nominal amount of money.

Senator **Bradley**. Is there any instance where bond funds have been used to clean up a spill or reclaim an area?

Mr. **Herrera**. Certainly not to my knowledge on the North Slope. That might have happened along the route of the Trans Alaska Pipeline. I do not know that. That is a situation. They have a huge fund there. But on the North Slope, the operator has the requirement of cleaning up all spills, and I do not think there has been a single instance where that has not happened.

Mr. **Weeks**. I know of no instance where the bonding money was used for that purpose.

Senator **Bradley**. What would be your attitude generally to special bonding requirements that you would be required to post in order to ensure protection and reclamation of the area?

Mr. **Weeks**. Generally negative because they would tend to detract from the overall attractiveness of the operation we were undertaking. And it would seem to me they would detract from the Federal Government's view of those as well.

Mr. **Cook**. Senator, I would like to give a somewhat different answer to that, if I might, and not to argue with Mr. Weeks, but I guess we, speaking for Chevron, would not have any objection to that.

Senator **Bradley**. You do not.

Mr. **Cook**. Well, let me finish. I think what we would do is discount our bids and so forth accordingly, and I think that really gets me to the same point where Mr. Weeks is.

Senator **Bradley**. So you say that what we have to weigh is how much less Federal revenue we want in order to protect the environment.

Mr. **Cook**. There would be a cost to it, yes, sir.

Senator **Bradley**. Do you have any comment?

Mr. **LaGarde**. No, I agree with that comment. It would be a cost that you would have to factor into your bidding process.

Senator **Bradley**. Let me ask you, what effect does the $250,000 bond have on your offers?

Mr. **Cook**. Nominal.

Senator **Bradley**. How much would a $500,000 bond have on your offer?

Mr. **Weeks**. A little bit more.

Senator **Bradley**. You can see where we are headed.

At some point it would be helpful to know what dimension would we be talking about where your point would be a very real consideration and at what point is it nominal, if you could share that with the committee.

Do you have any thoughts now?

Mr. **Weeks**. I do not have any idea on that at this point.

Mr. **Cook**. Senator, I will take a stab at it. I guess it depends on what you require in the way of rehabilitation. And if that is the complete removal of not only all facilities but gravel placements and that sort of thing, your cost would probably approach the original installation cost. And therefore, if you had to provide for those kinds of funds through bonding or escrow or set-aside of money, I mean, you are talking about a substantial amount of money. I believe the requirements in the case of the Trans Alaska Pipeline are very substantial.

Senator **Bradley**. All right.

Before I got here I was told that you basically suggested that summer drilling was an option as a part of the exploratory phase, is that correct?

Mr. **Herrera**. Yes, it was discussed, and it certainly has happened. So it should be an option, yes.

Senator **Bradley**. It seems that yesterday there was a very clear view that it should be winter only drilling.

If you were talking about a fudge factor—for example, you are beginning a project and you have a cutoff date but you want to complete it and you need a couple extra weeks—that is quite different than saying basically what you want to do is operate year around, given the vulnerability of the area to any kind of area, environmental problem that could flow in the summertime.

So the question really is what would you suggest as a fudge factor around a specific limitation that would take into account your legitimate concerns?

Mr. **Herrera**. Senator, I sort of brought this up, so if I may try and answer your question, I am not proposing that any operations should be allowed outside the winter season which could be recognized as harmful to wildlife. That is an understanding which we all hopefully have now, and so a summer operation would only be allowed with that caveat uppermost in people's minds, that wildlife would not be adversely impacted.

But to specifically answer your question about a sort of fudge factor, either early on in the season or later on in the season, and it is worth repeating that preferentially, industry would choose the wintertime to drill exploration wells. It is easier and it is cheaper for us. It is very difficult to see a rationale of November 1 being the starting date when in some years break-up occurs literally three or four weeks earlier than in other years—oh, so sorry, freeze up in this case. And similarly, break-up might be the end of May or it might be the first week in May. Therefore, there is nothing magical about the last day of April.

And if an operation is continuing and there is a factor of physical safety present by prolonging the operation into the middle of May, then I think it is clearly arguable that that should be allowed.

But that is common sense, and that should be left up to the field officers that are overseeing the action at the time in whatever agency is in charge.

Senator **Bradley**. So you say that—I did not quite get your attitude toward drilling in July and August.

What is it?

Mr. **Herrera**. Well, when that came up this morning before you came in, Senator, it was specific to after a discovery had been made, to try to accelerate the delineation drilling phase and thereby cut off a year or two of the time it takes to decide whether you have got a commercial oilfield on your hands or not. So that was not suggesting that all exploration should be allowed in the summertime, although logically—I mean, you can either drill safely in the summer or you cannot, and if you can, why not allow it?

Senator **Bradley**. And your position is that you can.

Mr. **Herrera**. Oh, yes, it has been done many times, and my point is, go back to the record and see if those events were harmful or not, and if they were not, then it should be allowed.

Senator **Bradley**. If this was a hotly contested item, would you suggest any compromise on the position of 12-month drilling?

Mr. **Herrera**. Yes. I was actually not advocating exploration drilling in the summertime. I was advocating because we prefer to drill in the winter, the exploration phase to be in the winter, as is customary, but delineation drilling after a discovery to be allowed year around. That would be my compromise.

Senator **Bradley**. All right.

Do you agree?

Mr. **LaGarde**. That is not a bad idea. What we are struggling with is a problem that we always have when we are arguing among ourselves on how to develop any project, and that is trying to decide what exploration or development or delineation drilling is, and it is sort of like trying to come up with reasonableness. It is a standard or what development drilling to you may not be the same thing as development drilling to another company. So it is sort of a universal problem we always have.

Senator **Bradley**. It is difficult to get a very tight definition.

Mr. **LaGarde**. You can do it arbitrarily, but it does not always work very well.

Mr. **Weeks**. Senator, it seems to me the best solution would be to give the Secretary the authority because it is going to be site-specific, unique circumstances that will dictate what it is and when it is.

Senator **Bradley**. Well, could you imagine a Secretary that you might not want to give that authority to?

I assume you could.

One last question. You mentioned the mud, the basically hazardous mud that would be used, and my question is what if there was a prohibition on the dumping of that type of mud and cuttings in the refuge?

Mr. **Herrera**. There already is, Senator.

Senator **Bradley**. So you fully support that no hazardous mud should be dumped in the wildlife refuge.

Mr. **Herrera**. Absolutely. That is current law.

Senator **Bradley**. And what about cuttings?

Mr. **Herrera**. Well, the definition is quite clear, and if the cuttings are covered with a hazardous material, then they have to be disposed of as hazardous material themselves.

Senator **Bradley**. And that is what you send to Louisiana or——

Mr. **Herrera**. Out of the State of Alaska, because the State does not have—no, we do not send them to Louisiana, I assure you.

Senator **Bradley**. You do not send them to Louisiana? I do not know how I could have made that mistake.

Thank you very much, Mr. Chairman.

The **Chairman**. Senator McClure?

Senator **McClure**. I want to explore one issue for a moment, and that is how much certainty is needed in the statute to tie together those who invest the money for exploration to the right to develop.

There have been suggestions made that we do exploration independent of development rights. What does that do to the investment decisions by your companies?

Mr. **Weeks**. That would not be very attractive at all to spend your exploration expertise and dollars with no assurance that you could develop it. I do not suspect you would get very many people interested in participating in a program like that, Senator.

Senator **McClure**. Mr. Herrera?

Mr. **Herrera**. Senator, my answer would be the same.

Mr. **Cook**. The same answer, Senator. There is just no incentive to proceed with costly exploration.

Mr. **LaGarde**. Senator, the concept that the 1002 leasing system should ensure that we proceed with all phases of drilling was one of the key items that I mentioned early on. To enact proposals to allow exploration to proceed without the attendant development rights would be a mistake.

Senator **McClure**. You say it would be a mistake. How bad a mistake? We make lots of mistakes. Some are more serious than others.

Mr. **LaGarde**. This would be a very serious mistake. It is good policy today, I would suggest, from a public policy standpoint as well as it has been in the past to allow industry to take the risk where it is willing to, so long as it is assured that it can participate in the benefits of taking that risk, but if this were a split process, we would have very little interest in coming up with very much money to participate in that process because it does not give us anything.

Senator **McClure**. Let me go to the next step. That is, if you have exploration and the exploration indicates that you ought to do some development work and you have the right to do the development work and you do it, how much assurance do you need at this time that you would be permitted to go ahead as contrasted to the possibility that environmental or judgmental barriers would be raised against further development?

Mr. **Weeks**. I guess if the development opportunity is there on the front end, we are willing to, since we understand the regulatory process as it exists, we are willing to take that risk.

Senator **McClure**. You will risk the regulatory process as it now exists.

Mr. Herrera.

Mr. **Herrera**. Yes. I think that only becomes an issue, Senator, if we have the misfortune to discover a field which is very marginal or perhaps submarginal, and then everybody has a very difficult decision. Does one change the degree of environmental protection to allow this field to be produced, or does it stay in the ground?

But if we find a large enough field, I think the risks inherent in the NEPA process and the decisionmaking process are ones acceptable to industry.

Senator McClure. All right.

Any other comments?

Mr. Cook. Well, I think we would accept that risk, again, as Mr. Herrera stated, with a large enough discovery.

Mr. LaGarde. Senator, in fact, in the OCS process there have been occasions where industry did take leases, and they were pulled back by the Secretary of Interior because there was an environmental problem, and one that comes to mind is off Texas, the Flower Garden Banks Reef. I believe Mobil had two leases on that reef at one time, and it was taken back by the Secretary because he did not want to risk the environmental damage that he perceived could be.

Senator McClure. But you know that hazard well enough and the process, the regulatory process well enough that that is an acceptable risk to you in making the up front investments.

Mr. LaGarde. Yes, sir.

Senator McClure. There is one additional factor in Alaska more than anywhere else. We only have precedent, really, that tells us very much about the further risk that accompanies a decision to permit a pipeline.

Does that pose unacceptable risks with respect to the future of the development of a field, if discovered?

Mr. Weeks. We think that the experience we have had with TAPS and at Prudhoe Bay, the technology, the understanding at the stage we are at mitigates to a large extent a lot of the concerns that existed early on, and I think an acceptable risk that a safe pipeline could be built because of our past experience.

Senator McClure. All right.

Mr. Herrera. Senator, I think it is reasonable for us to suggest that that risk should be eliminated to the degree it can be.

Everybody knows what the object of this exercise is. It is to find oil and to produce it safely. Obviously one needs a pipeline to do that. Therefore, to sort of put an added hurdle in our way which says there is no certainty that you will get a pipeline seems to be defeating the object of the exercise.

Senator McClure. Well, I think you know and certainly I know, whether it is in this particular decision to allow exploration or whether it is in OCS or other sensitive areas, environmentally or politically sensitive, there are those who do not want you to be successful, and no matter what judgment we may make as a Congress or as a government, there will be those who seek to reverse that decision. If indeed the decision is favorable to exploration, they will try to avoid any exploration. If the decision is favorable for development, they will try to avoid any development. If the decision after development is to go ahead and produce from that field, and they can stop production by stopping the pipeline, they will try to do that.

I do not think I am overstating the case, and I do not think I am saying anything that surprises you.

The more sensitive the area, the more real that threat becomes because obviously they have a better ground upon which to make their claims.

That is the reason I asked the question, whether or not in this particular instance you see those as being destructive of your capacity to make investment decisions in the first place, or do we have to remove or minimize those at this time. And I am not asking you for a wish list because obviously you would like us to give you absolute assurance.

I am asking you for a value judgment as to how it affects your judgments with respect to the investment decisions.

Mr. **WEEKS**. I think the risks are reflected in the bonus bids that are prepared. We factor in the expectation of the time, the expectation of the delays, the probability of certain events happening at a certain time, and if the accumulation is large enough, again, you still go ahead, and you get to the point where Roger got to, that at some point the accumulation is not large enough, and you do not go ahead.

Mr. **HERRERA**. I think that it has got to be clearly understood, because we certainly understand. The hardest thing we do is find a large oil field. Everything else is easy. The physical building of the pipeline and so on is a snip, really, even with all the environmental protection put in. It is very frustrating, therefore, if that easy operation is made impossible because of litigation or somebody's viewpoint.

Senator **MCCLURE**. Any other comments?

Mr. **LAGARDE**. Well, Senator, my only comment would be that none of that is free for us, and none of it is free for the government, and none of it is free for the consumer.

Senator **MCCLURE**. Let me ask a follow-up because you indicated that indeed it would be reflected in the bonus bid. The greater the hazard, the lower the bonus bid.

Am I stating that correctly?

Mr. **WEEKS**. Yes, sir. Our judgment of the hazard.

Senator **MCCLURE**. In your judgment of the hazard, as the uncertainty rises, the bonus bid goes down. Is that correct?

Mr. **WEEKS**. In general, yes.

Senator **MCCLURE**. Any disagreement on that?

Mr. **LAGARDE**. No, sir.

Senator **MCCLURE**. So the greater certainty we put in, the higher the bonus bid.

Mr. **WEEKS**. Yes, sir.

Senator **MCCLURE**. Thank you very much.

No further questions.

The **CHAIRMAN**. Gentlemen, thank you very much.

Let me say, Mr. Herrera, especially on this subject of the core calving areas, at least from my standpoint, I am persuaded by your testimony that a simple delay would not effectuate any purpose if all you have is winter drilling because again, that does not disturb the caribou, so you would never know. You are just delaying.

Second, I am persuaded as I have listened to you on the question of having summer drilling as a test. Staff and I were sitting here trying to decide how we might design such a provision, and I am persuaded myself that it cannot be done because you have either got too little or too much. If you just say drill a couple of wells in there, then no one would be—you could not satisfy the opponents. They would say, well, two wells is not enough. Your baseline data, your data base is not broad enough. And you do it for two years, and they would say, well, the caribou come here only five of 13 years anyway, or seven of 13 years, and so two years is not enough, and you do it five years, and that is not enough, and you say, well, all right, we will do ten wells, and they say no, ten wells is too much. That would give the whole impact that you are trying to avoid.

So I think in my view the job for this committee is either to decide to lease or not to lease the core calving area, to decide whether it would or would not disrupt the caribou, and not have one of these tests because the test is not likely to be successful, or not likely to satisfy anyone.

There have been tests. You are all familiar with that study that they have had that shows that caribou in their calving areas were disrupted; one and a half kilometers, I think, was the figure. Now, that is a data base, but it obviously does not satisfy people, and I do not think it would satisfy to have two or three or four summer holes in the core calving area either.

So I think we had better decide yea or nay on the subject.

All right.

I would invite you all to give us something in writing on Mr. Herrera's suggestion of having the exploratory phase more broadly defined and going over into the summer, and of course, we will want tomorrow for the environmental groups to speak to that issue as well.

It seems to me if we are gong to have drilling in ANWR, we ought to have maximum protection, but we ought to expedite it as much as possible. I mean, it does not help environmental values simply to delay. It simply makes it more expensive and delays the receipt by the American public of this oil, if there is oil, and we hope there is.

I would also invite each member of the panel to respond to our issue list. Many of these we have responded to. I mean, for example, the exploration-only option I think has been more than sufficiently responded to by these witnesses and others, and I believe the record is very clear on that.

There might be other issues there that you would want to respond to, for example, maximum size of lease tracts, the term yesterday you heard us talking about the question of the ten year term. It seems to me the ten year term is really meaningless, that we ought to have some other standard if we are capable of drawing that up, something like they have in the hard rock mining plans, because really the time is going to be more dependent on external restraints of government than they are on the willingness of companies to go forward.

At the same time, we need to define what the standard is so that if companies do not go forward, then we will know that. And maybe the adoption of some kind of development plan would be the way to do that.

In any event, I would invite you to give us something in writing on that, as well as any of these other issues, as well as anything that comes to your mind that you would like for the committee to have.

Senator **Bradley**. Mr. Chairman, could I ask two more questions?

The **Chairman**. Yes.

Senator **Bradley**. Thank you very much.

Mr. Herrera, getting back to the hazardous drilling muds, are there chemicals in the hazardous muds that, if they were not in the oil and gas area, would be included under the Resource Recovery Conservation Act as hazardous wastes? Is there not an exemption from that act for oil and gas?

Mr. **Herrera**. Yes. Under that act—well, yes and no. Under that act, mud and cuttings are not defined as hazardous material. Now, also under that act, the EPA has undertaken a study over the last two or three years to determine whether in fact that decision was correct or not, and in fact, about a week or two weeks ago the draft report of EPA, which was a nationwide study of the nature of mud and cuttings and whether they should be redefined as hazardous or not, came out.

The draft report obviously is not their final say, but it indicated that in fact the first decision was probably correct and that there is no overwhelming data to suggest that the status quo should be changed.

So when that report gets finalized, presumably mud and cuttings will remain as nonhazardous materials and be dealt with accordingly.

Senator **Bradley**. Are there particular chemicals involved here that are hazardous and therefore exempt because they occur in an oil and gas context as opposed to some other context?

Mr. **Herrera**. No, I do not. Bearing in mind that the generic muds which are—by generic I mean a sort of general, benign mud which has been developed over the last 15 years for use in the Arctic because of the fact that it is benign, contains natural materials which have heavy metal impurities in them which it is very difficult to control. Barites, for example, which is mined in many places around the country, is not always in a totally pure form. It might have some heavy metals in with it. However, I believe what you are referring to—or perhaps you are. I am not sure—is chrome, for example, which used to be in muds used in the North Slope and is a problem material, chrome is no longer used. It has been deliberately excluded to try to make the muds more benign.

Senator **Bradley**. So to your knowledge, other than chrome, you cannot conceive of any other chemical that might be included under The Resource Recovery Conservation Act but is specifically exempted when it occurs in the context of oil and gas. development

Mr. **Herrera**. No, not in quantities which are going to be harmful, no, and some of these trace heavy metals are going to be present, but not in harmful quantities.

Senator **Bradley**. The second question gets back to the cost of cleanup, that relates to the bonding question. There is a letter from the Alaska Oil and Gas Association that makes the following point on removal of facilities constructed for exploratory drilling. It says the rehabilitation of the site will cost 1.5 to 2 times the original construction costs. Current construction costs for an onshore drill site and air strip are $4 million to $11 million.

Now, do you read that to mean that cleanup then is $8 million to $21 million?

Mr. HERRERA. There are two points which need to be borne in mind in that letter, Senator. I believe it is correct to say that the letter was referring to old exploration sites which have been abandoned, as was the custom over the last 15 or 20 years, and there are now scattered perhaps 200 miles from Prudhoe Bay over the tundra, so to speak. A lot of them—well, they were just left there and allowed to revegetate on their own if nature so desired.

Now, to go back to one of those locations and to rehabilitate it would be a very expensive proposition. On the other hand, if you are presently drilling and exploration well on the tundra and you are there physically and you undertake the rehabilitation of that well, then the costs are going to be orders of magnitude less than in the first case.

Senator BRADLEY. I see. And so your view is that this refers to the older, abandoned wells, not to active wells, this figure of $4 million to $11 million?

Mr. HERRERA. Mr. Cook can perhaps give you a better answer on that.

Senator BRADLEY. Yes, I did not mean to just ask you, Mr. Herrera. There are other people on the panel who probably know some of these things.

Mr. COOK. Senator, I have not seen that particular letter, but as you describe it, that order of cost would be about right for an exploratory drill pad and a gravel airstrip such as we built years ago. So I would guess that it does apply to the older drill sites.

The CHAIRMAN. Senator Bradley, we have five other witnesses.

Senator BRADLEY. Thank you very much, Mr. Chairman, for allowing me to ask these two additional questions. I do think they help clarify the record.

The CHAIRMAN. And we would like to hold the record open for additional written questions.

I am sorry to have to cut you off, but we have some witnesses here from Alaska.

Thank you very much, gentlemen. You have been an excellent panel.

Senator MURKOWSKI. Mr. Chairman, while you are calling the other panel up, I wonder if I may for the record include an opening statement, and also an addendum indicating approximately $10½ billion that were expended from 1980 through 1986 in the 50 states, including I think about $42 million in New Jersey, and in Louisiana about $147 million.

The CHAIRMAN. Yes, indeed.

Senator MURKOWSKI. And I would also like to point out for the record that Alaska does not have a hazardous waste disposal site. Even our dry cleaning fluids are sent in barrels outside the state, at a shipping cost of about ten times what it was to ship them in, because they do not come in in a hazardous condition. And further, that EPA has come down with a statement on drilling muds that indicates that conventional drilling muds are not hazardous or toxic, and we will submit that for the record.

Thank you, Mr. Chairman.

[The prepared statement of Senator Murkowski follows:]

OPENING STATEMENT
SENATOR FRANK H. MURKOWSKI
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
HEARING
S.1217
OCTOBER 14, 1987

MR. CHAIRMAN, YESTERDAY WE HEARD FROM THE GOVERNMENT--THE REGULATORS--ABOUT HOW WE COULD MODIFIY THE LEGISLATION TO LEASE ANWR. OFFICIALS OF THE DEPARTMENT OF INTERIOR, THE ENVIRONMENTAL PROTECTION AGENCY, AND THE STATE OF ALASKA TOLD US THEIR RECOMMENDATIONS.

TODAY, WE HEAR ANOTHER VIEW -- THAT OF THE INDUSTRY--THOSE WHO ARE REGULATED.

THE TESTIMONY FROM SPOKESMEN FOR THE INDUSTRY IS ESPECIALLY IMPORTANT -- BECAUSE INDUSTRY IS MOST CLOSELY INVOLVED WITH THE ANWR ISSUE.

THEY KNOW ALASKA, THEY KNOW THE COSTS INVOLVED, THEY TAKE THE RISKS, THEY UNDERSTAND THE ENVIRONMENTAL CONSIDERATIONS AND THEY OPERATE UNDER THE LAWS WE SET FOR THEM. ...IN OTHER WORDS, THEY KNOW FIRST-HAND WHAT WORKS AND WHAT DOESN'T.

INDUSTRY HAS A LEGITIMATE BASIS FOR PROVIDING TESTIMONY ON THE SUBJECT BEFORE US. THE PETROLEUM INDUSTY, THROUGH ITS MANY YEARS OF EXPERIENCE ON ALASKA'S NORTH SLOPE, BUILDING THE TRANS ALASKA PIPELINE, AND EXPLORING FOR OIL OFFSHORE ALASKA, HAS FUNDED THE MAJORITY OF THE RESEARCH AND KNOWLEDGE THAT WE HAVE TODAY ABOUT DEVELOPMENT IN THE ARCTIC.

BESIDES THE OIL INDUSTRY, WE WILL BE HEARING FROM THE MARITIME PEOPLE. THEY ALSO HAVE BEEN CLOSELY INVOLVED WITH ALASKA OIL OVER THE PAST DECADE. THE MARINE ENGINEERS BENEFICIAL ASSOCIATION (MEBA) PROVIDE THE PILOTS FOR THE SHIPS THAT DELIVER ALASKA CRUDE TO AMERICAN MARKETS.

THEY RECOGNIZE THE GREAT BENIFITS FOR AMERICA, IN TERMS OF JOBS AND THE ECONOMY, THAT ARE DERIVED FROM DOMESTIC OIL PRODUCTION. AND ALONG WITH THE PETROLEUM INDUSTRY, THEY RECOGNIZE THAT DEVELOPING ANWR IS CRITICALLY IMPORTANT TO AMERICA'S LONG-TERM ECONOMIC, ENERGY, AND NATIONAL SECURITY.

WHEN YOU TALK ABOUT THE BENEFITS ASSOCIATED WITH OIL PRODUCTION IN ALASKA, IT'S INTERESTING TO REFLECT FOR A MOMENT ON WHAT WE'RE TALKING ABOUT -- THE "BOTTOM LINE" SO TO SPEAK.

THOSE BENEFITS DON'T GO, AS SOME WOULD SUGGEST, JUST TO THE STATE OF ALASKA. EVERY ONE OF THE 50 STATES REAPS AN ECONOMIC BENEFIT FROM THE DEVELOPMENT DOLLARS.

IN DEVELOPING OF THE NORTH SLOPE OIL FIELDS, ACCORDING TO THE INDUSTRY, 10-AND-A-HALF BILLION DOLLARS WAS PAID OUT FOR MATERIAL AND SERVICES TO VENDORS THROUGHOUT THE UNITED STATES.

(-REFER TO MAP-)

FOR INSTANCE, $765 MILLION WAS SPENT IN THE STATE OF WASHINGTON. $147 MILLION IN THE CHAIRMAN'S HOME STATE OF LOUISIANA. $1.8 BILLION WAS SPENT IN CALIFORNIA. ALMOST $3.5 BILLION IN TEXAS. $145 MILLION IN COLORADO, $128 MILLION IN OREGON... EVEN .8 MILLION IN HAWAII.

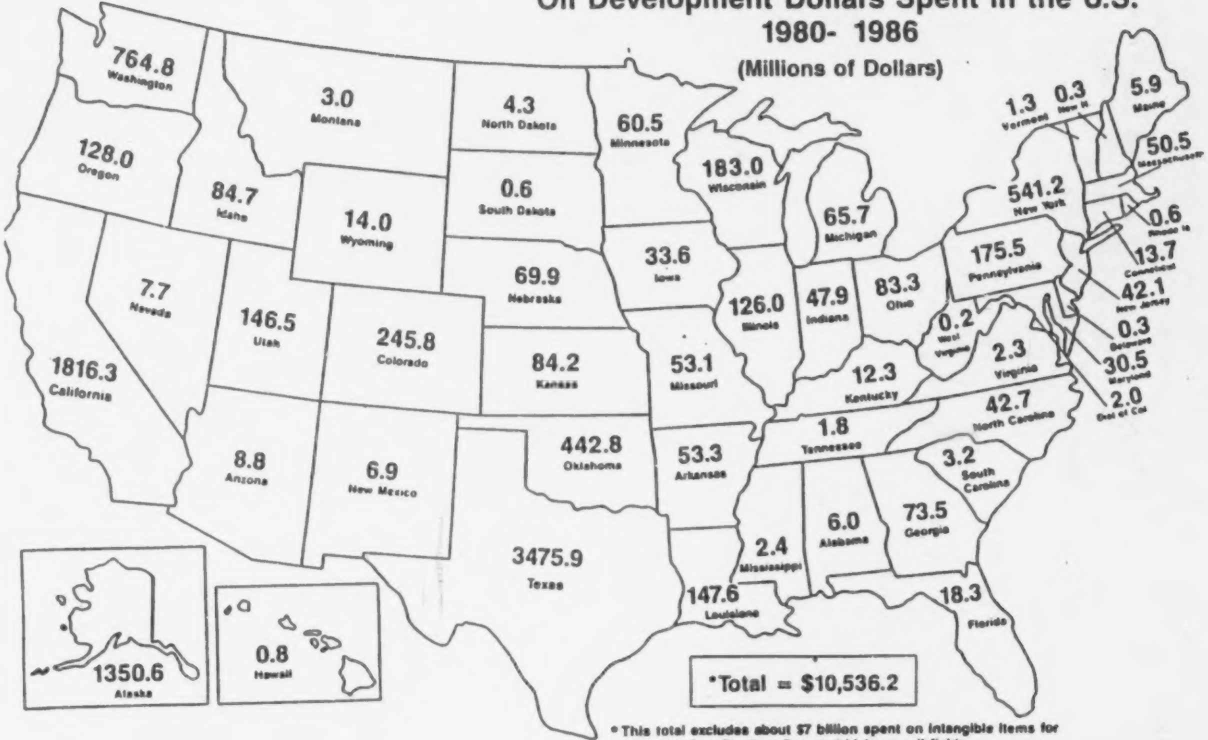
THE POINT IS MR. CHAIRMAN, (AND I ASK THIS CHART BE INSERTED IN THE RECORD), IS THAT DOMESTIC OIL PRODUCTION HAS A SIGNIFICANT ECONOMIC IMPACT FOR ALL AMERICA. IT PROVIDES JOBS, NOT ONLY IN ALASKA WHERE THE DRILLING AND PRODUCTION TAKES PLACE, BUT JOBS, SALES, AND AN ECONOMIC BOOST IN EVERY ONE OF THE 50 STATES.

THE MARITIME PEOPLE RECOGNIZE THIS, AND I APPLAUD THEM FOR COMING FOWARD TO ENDORSE ANWR PRODUCTION. I HOPE THAT OTHER UNIONS WILL FOLLOW SUIT AND HELP MAKE SURE WE KEEP A HEALTHY ECONOMY AND ENERGY SECURITY FOR THE UNITED STATES.

I LOOK FORWARD TO HEARING THE TESTIMONY OF TODAY'S WITNESSES, AND I AGAIN THANK THE CHAIRMAN FOR MOVING FORWARD EXPEDITIOUSLY WITH THESE PROCEEDINGS. WE'RE ON A VERY POSITIVE TRACK, AND I LOOK FORWARD TO WORKING WITH YOU AND THE COMMITTEE TO CRAFT THE KIND OF COMPROMISE THAT WILL ACCOMODATE THE CONCERNS WE HEAR DURING THESE HEARINGS AND YET ALLOW US TO GO FOWARD AND OPEN ANWR.

North Slope Alaska
Oil Development Dollars Spent in the U.S.
1980- 1986

(Millions of Dollars)


764.8
Washington
128.0
Oregon
1816.3
California
7.7
Nevada
84.7
Idaho
3.0
Montana
14.0
Wyoming
146.5
Utah
8.8
Arizona
245.8
Colorado
6.9
New Mexico
4.3
North Dakota
0.6
South Dakota
69.9
Nebraska
84.2
Kansas
442.8
Oklahoma
3475.9
Texas
60.5
Minnesota
33.6
Iowa
53.1
Missouri
53.3
Arkansas
147.6
Louisiana
183.0
Wisconsin
126.0
Illinois
2.4
Mississippi
65.7
Michigan
47.9
Indiana
1.8
Tennessee
6.0
Alabama
83.3
Ohio
12.3
Kentucky
73.5
Georgia
18.3
Florida
0.2
West Virginia
2.3
Virginia
42.7
North Carolina
3.2
South Carolina
175.5
Pennsylvania
541.2
New York
1.3
Vermont
0.3
New H
5.9
Maine
50.5
Massachusetts
0.6
Rhode Is
13.7
Connecticut
42.1
New Jersey
0.3
Delaware
30.5
Maryland
2.0
Dist of Col
1350.6
Alaska
0.8
Hawaii

*Total = $10,536.2

* This total excludes about $7 billion spent on intangible items for Kuparuk, East Prudhoe Bay, and Lisburne oil fields.

The CHAIRMAN. Next we are happy to welcome Oliver Leavitt, Vice President of Arctic Slope Regional Corporation, who has an excellent statement which I have read, Mr. Leavitt. I hope you will summarize it very quickly because we are almost out of time. That seems to happen with us, that we schedule too many witnesses. And I have read your statement. It is excellent.

Please proceed.

STATEMENT OF OLIVER LEAVITT, VICE PRESIDENT, ARCTIC SLOPE REGIONAL CORP., ACCOMPANIED BY WILLIAM J. VAN NESS, JR., COUNSEL, ARCTIC SLOPE REGIONAL CORP.

Mr. LEAVITT. Thank you, Mr. Chairman.

Again, my name is Oliver Leavitt. I am the Vice President of the alliance for the Arctic Slope Regional Corporation. The ASRC is the Eskimo-owned regional corporation for the 56 million acre North Slope area of Alaska.

For the record, Mr. Chairman, on behalf of the North Slope Borough Mayor, I was asked if I would submit for the record his testimony.

The CHAIRMAN. Yes. Without objection, we will put his entire statement in.

Mr. LEAVITT. I would like to submit my full testimony for the record and provide the committee with a brief summary.

The CHAIRMAN. Yes, please.

Mr. LEAVITT. The background section of my testimony identifies the three major interests of the Inupiat Eskimo people in the pending Coastal Plain decision. These interests are protecting Eskimo culture, lifestyle and subsistence use of the study area, securing permission to develop the economic potential of the 92,160 acres of privately owned lands in ANWR, and opening the coastal plain to oil and gas leasing under the proper land use planning and environmental regulations.

Mr. Chairman, if I may, I forgot to mention a very important gentleman in my life and to the Eskimo people. To my left is William Van Ness, Counsel for the Arctic Slope.

The CHAIRMAN. Where is he from?

Mr. LEAVITT. He is from Washington, D.C. and represents us here.

The CHAIRMAN. I am glad you introduced him to the committee.

Mr. LEAVITT. I thought I had better do that, Mr. Chairman.

The CHAIRMAN. We are always glad to have Bill Van Ness back before the committee.

Mr. LEAVITT. As you requested today's witnesses to specifically address how the oil and gas resources of the 1.5 million acre Coastal Plain Study Area can be competitively leased, explored and developed in a manner that is environmentally responsible, it is clear to my people from the more than 40 year history of oil and gas exploration and development of Alaska's North Slope that the Coastal Plain Study Area can be safely opened to leasing and exploration and development.

With that background, I would like to proceed by making some specific suggestions and recommendations for the committee's consideration.

ASRC supports the enactment of S. 1217 with appropriate amendments to address land use planning, to deal with the environmental issues and other matters of concern to ASRC and our shareholders.

[The prepared statements of Mr. Leavitt and the North Slope Borough follow:]

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October 14, 1987

TESTIMONY
OF
OLIVER LEAVITT
VICE PRESIDENT
ARCTIC SLOPE REGIONAL CORPORATION

October 14, 1987
Senate Energy and Natural Resources Committee

My name is Oliver Leavitt. I am the Vice President for Arctic Slope Regional Corporation (ASRC). ASRC is the Eskimo-owned regional corporation for the 56 million acre North Slope area of Alaska.

1. Background

ASRC presented testimony before this Committee on June 4, 1987. At that time, we commented on the Department of the Interior's Section 1002(h) resource assessment report on the coastal plain study area of the Arctic National Wildlife Refuge (ANWR). We also identified the nature of our direct interests in the pending Congressional decision on opening the coastal plain. Our interests include:

- Protecting the rights of the Eskimo residents of the Village of Kaktovik to pursue the life style of their choice, including their continued subsistence use of the coastal plain area;

- Removing the provisions of Section 1003 of ANILCA which prevent ASRC and Kaktovik Inupiat Corporation (KIC) from developing the oil and gas resources on the 92,160 acres of land we own within ANWR and within and adjacent coastal plain study area; and

- Supporting a policy to open the coastal plain area to competitive leasing, exploration and development under prudent and appropriate environmental regulations.

Mr. Chairman, I ask that the text of our June 4 testimony and submissions be incorporated by reference in today's hearing record together with my statement.

On behalf of ASRC's shareholders and the residents of the Village of Kaktovik, I want to commend the Committee for conducting a field trip in August to the North Slope and the coastal plain and for meeting with the people of Kaktovik.

The future of the coastal plain is of immense importance to the residents of the Village and to all of ASRC's shareholders. The visit of many of the Members of this Committee gives us greater confidence that Congress will carefully consider the importance of our cultural, subsistence and economic interests in the coastal plain decision.

2. Purpose of Hearings

Mr. Chairman, you have requested today's witnesses to specifically address how the oil and gas resources of the 1.5 million acre coastal plain study area can be competitively leased, explored and developed in a manner that is environmentally responsible and compatible with the purposes for which the Arctic National Wildlife Refuge (ANWR) was created.

The Inupiat Eskimo shareholders of ASRC welcome these hearings. The time has come to move the focus of the debate on the coastal plain away from rhetoric; away from the caricatures of "Big Oil" versus "caribou"; away from simplistic notions of "good" versus "evil"; and away from the polar extremes of "wilderness" versus "unregulated industrial development".

It is time for a reasoned and responsible examination of how the nation can have the major benefits of developing the potentially huge oil and gas resources of the coastal plain and, at the same time, protect this area's environment, its fish and wildlife resources and its subsistence users.

Mr. Chairman, as discussed in our June 4 testimony, the Eskimo people have been careful observers of oil development on the North Slope. We have, over the past twenty years, been critical of some proposals and some industry practices. We have litigated a number of those matters and brought others to the attention of regulatory agencies and the Congress. By and large, these issues have been fairly resolved.

We have studied the coastal plain issues carefully. Our 3700 shareholders are confident that the oil and gas potential of the 26 major prospects identified to date in the study area can be safely developed with proper planning and regulation. That clearly is the conclusion that has to be drawn from the history of Prudhoe Bay, the Kuparuk field and the Endicott field. These fields now produce almost two million barrels of oil per day; 23 percent of the nation's total domestic production. This oil is produced in a manner that is environmentally sound and, in general, compatible with the fish and wildlife resources of the North Slope and the interests of the Eskimo people.

Development of the North Slope has taken place under regulations and permit stipulations issued by the Secretary of the Interior, the State of Alaska and the North Slope Borough. In our view, this development has served the national interest, has generally been properly regulated and has been sensitive to the environment and the wildlife which utilize the Slope.

This is not to say that no mistakes have been made in North Slope oil development over the past twenty years. Mistakes have been made and will be made in the future. This is to be expected in any large scale development taking place in a harsh and unique environnment. What is important is that the mistakes have not been serious and that the government and the operators have shown continuing progress and improvement in planning and regulation and in engineering and technology.

The major issue before the Committee is how to develop the coastal plain study area with minimal adverse impact on the study area's environment, its fish and wildlife resources and the Eskimo people who live on and use these lands. Every American has a critical stake in the coastal plain decision. But the Eskimo people of Kaktovik and the North Slope have the most at stake -- now and for the long term -- in how this issue is resolved.

3. NPR-A Drilling Program

Fortunately, there is a substantial body of knowledge, experience and precedent for confidently making a sound decision to open the coastal plain. There have been more than forty years of oil and gas exploratory and operational experience in the North Slope's Arctic environment.

The early years of experience were gained under the Department of the Navy's exploratory drilling program in the 23 million acre area -- then known as the Naval Petroleum Reserve-No. 4 -- west of Prudhoe Bay. Exploratory drilling was conducted by the Department of the Navy from 1944 to 1953. A number of oil and gas fields were discovered which would have been considered major fields if they were located in the lower 48 States. Because of Alaska's remoteness and high transportation costs, however, none of the fields were commercial.

My home, the Village of Barrow, now uses natural gas for heat and electricity. This gas was discovered as a result of the Navy exploratory program. A second round of exploratory drilling by the Federal government occurred between 1974 and 1980. Again, no commercial discoveries resulted from this program. But a great deal was learned.

4. The Prudhoe Bay Experience

The Committee can also draw on over twenty years of exploratory and operating experience at Prudhoe Bay and adjacent oil fields in the Central Arctic. That experience has been positive and constructive. Prudhoe Bay has led to very impressive improvements in Arctic oil and gas planning, in engineering and technology, and in understanding the Arctic environment. Kuparuk, Endicott and subsequently discovered fields reflect these improvements.

Prudhoe Bay has also led to refinements in the regulatory regime under which these activities are conducted. The North Slope experience has greatly expanded our knowledge of the area's fish and wildlife resources and their adaptability to properly regulated oil and gas exploration and development activities. This Committee needs to draw on that experience in determining the future of the coastal plain study area.

5. NPR-A Leasing Programs

In 1980, Congress adopted the Department of the Interior and Related Agencies Appropriation Act for Fiscal Year 1981 (Public Law 96-514 - Dec. 12, 1980, 94 STAT. 2964). One section of the Act authorized the opening of the 23 million acre area now known as the National Petroleum Reserve-Alaska (NPR-A) to competitive leasing, exploration and development.

There was little or no public controversy about the 1980 Congressional decision to open this area, about the environmental impacts, about the leases issued, or about the exploratory activities which have taken place in the NPR-A. Yet, the NPR-A is 15 times as large as the coastal plain study area. The Western Arctic caribou herd which utilizes the area is significantly larger than the Porcupine herd. The area is an important habitat for many species of waterfowl. Many of our Villages are located within the NPR-A. Far more Eskimo people utilize NPR-A for subsistence purposes than use the coastal plain area.

Our monitoring of the leasing program and extensive seismic surveys within NPR-A has disclosed no environmental, caribou or wildlife problems.

It is interesting to note that of the nine Members of this Committee who were in the Senate during the 1980 vote which opened the 23 million acre NPR-A to competitive leasing, eight Members voted "aye". I mention this because in the eyes of the Eskimos who live on the Slope, the wildlife and other issues which have been raised about the coastal plain are exactly the same. The difference is that the stakes -- in terms of the huge and well known oil and gas potential of the coastal plain -- are much higher.

6. Proposed Modifications in S. 1217

With that background, I would like to proceed by making some specific suggestions and recommendations for the Committee's consideration. If it will assist the Committee, ASRC will have these suggestions reduced to legislative language.

To have a point of reference, Mr. Chairman, ASRC's suggestions will be in the form of proposed modifications or amendments to the only authorization bill now before the Committee, S. 1217, the "Arctic Coastal Plain Public Lands Leasing Act of 1987" introduced by Senators Murkowski, Stevens and others.

ASRC supports the enactment of S. 1217 with appropriate modifications to address a land use planning process, environmental issues and other matters of concern to ASRC and our shareholders.

S. 1217, as introduced, is structured as an amendment to the Mineral Lands Leasing Act of 1920 and adds a new sub-Chapter to the Act entitled "Coastal Plain Leasing". The operative provisions of S. 1217 are patterned very closely after the NPR-A leasing authorization contained in the FY '81 Appropriations Act. S. 1217 authorizes a competitive leasing program in the coastal plain to be followed by exploration and development of the lands leased.

Set forth below are the major changes in S. 1217 which ASRC proposes for the Committee's consideration.

(a) Land Use Planning Process

ASRC recommends that a new section be added to S. 1217 directing the Secretary to conduct a coordinated land use planning process which has as its goal avoiding unnecessary duplication of facilities in the coastal plain study area and consolidating, wherever possible, common facilities, activities and developments. The purpose of this planning process is to minimize adverse impacts to the study area's environment, its fish and wildlife resources and its subsistence users.

One Member of Congress has referred to this objective as minimizing the "footprint" of development wherever this is economically, technically and strategically possible. The oil industry, the North Slope Borough and the Village of Kaktovik should be active participants in this planning process. The schedule and location of lease sales should be related to both tract nominations by industry and to this land use planning process.

The objective of the land use planning process is to achieve results similar to what has already been achieved in the Endicott field. No elaborate new planning procedure is proposed, no new studies are involved and no delay is contemplated. The planning process would proceed concurrently with the preparation of regulations to implement the competitive leasing program and to govern exploration and production activities.

As a part of this land use planning process, consideration should be given to utilization of existing facilities such as those at Prudhoe Bay, the abandoned Dew Line bases and the airport at Kaktovik. ASRC and KIC are prepared to provide land South of Kaktovik and Barter Island and to participate in the development of a consolidated model support and service base or bases to accommodate coastal plain exploration and developmental activities.

(b) Lands Leased

When the Department proceeds with preparations for conducting a lease sale within a particular area of the coastal plain study area, the Secretary should be directed to review the area or areas to be leased and to make a determination that those particular lands can be developed in an environmentally sound manner.

We suggest that the Secretary follow a practice that the oil industry has finally come to accept on the North Slope. That practice is to hire Eskimos who have local and historic knowledge of the area and its wildlife resources to assist in this review and determination.

(c) Monitoring and Research

Lands which are leased within the study area that have particularly high value for subsistence use and as habitat for fish and wildlife should be monitored and, where appropriate, research should be conducted with the objective of enhancing the compatibility of developmental activities with the well-being of the wildlife which utilize the area. A provision of this nature will ensure that activities conducted within the higher value coastal plain areas do not result in undetected or unanticipated adverse impacts on the wildlife of the study area. Here again, is a good project for hiring local Eskimo talent.

(d) Land Reclamation Responsibility

One problem area associated with North Slope energy development has been the occasional failure to conduct proper waste disposal and land reclamation. The problem was most serious with the Federal government's early NPR-A exploratory program in the 1940's and 1950's. But there have been infrequent problems at Prudhoe Bay, primarily with subcontractors and some companies in the oil service industry.

ASRC recommends language be adopted in S. 1217 which would make lease holders fully responsible and liable for reclamation of any significant disturbance on coastal plain lands. This responsibility would include the activities of all subcontractors and agents and could not be delegated or conveyed away, by contract or otherwise.

(e) Caribou Calving Area

Governor Cowper has proposed deferral of leasing in a 242,000 acre area of the coastal plain referred to as the "core calving area". The State acknowledges that this area contains 19 percent of the highest oil and gas potential of the coastal plain. Others have proposed that this area be designated as "Wilderness".

ASRC does not support delaying or excluding significant areas of the coastal plain from the competitive leasing program which S. 1217 authorizes. The burden of scientific evidence and the years of operating experience on the North Slope provide persuasive evidence that oil exploration and development on the coastal plain will result only in some minor displacement of caribou and other species which utilize the area for a small part of the year. This evidence is consistent with our people's observations as subsistence hunters of caribou and other wildlife on the coastal plain and on the North Slope.

ASRC believes that the "land use planning process" and "monitoring and research" approach we propose is a better policy for both the caribou and the nation. In the event that this Committee should nevertheless decide to accord this area special treatment, we recommend that the Secretary be directed to lease other prospects and areas of the coastal plain first. This area would then be leased after some concrete operating experience and knowledge has been gained.

(f) Environmental Regulatory Standard

Section 288(a)(5) of S. 1217 establishes the environmental and regulatory standard to govern activities on the coastal plain. This standard is virtually identical to subsection (1) of the section in the FY '81 Appropriations Act which opened the 23 million acre NPR-A to competitive leasing. The standard provides as follows:

> "(5) Activities undertaken pursuant to this section shall include or provide for such conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable significant adverse effects on fish and wildlife and their habitat pursuant to subsection 288(b) of this Act."

It is our understanding that this language, together with section 288(b)(1) of S. 1217, grants the Secretary authority to impose all reasonable regulations, stipulations, conditions, restrictions and prohibitions which have been promulgated or utilized to govern North Slope energy-related activities. And further, that the Secretary is authorized to impose these and other new provisions as appropriate to the circumstances. The Committee may wish to make this understanding explicit in the bill or in report language.

The Committee may also wish to consider incorporating by reference, and authorizing the Secretary, to use the most recent, "state-of-the-art" regulations, lease terms, stipulations and permit conditions governing energy related activities in the Arctic. These would include: (1) all applicable provisions of Federal, State and local environmental law; (2) the twenty-nine stipulations and mitigation measures set out at pages 167-169 of the coastal plain report; (3) the environmental standards which governed seismic exploration activities on the coastal plain (50 C.F.R. § 37.31-33); (4) the stipulations for exploratory drilling on the private lands of ASRC-KIC in the August 9, 1983, exchange agreement; and (5) other appropriate regulatory models.

We are aware that many Members of the Congress have expressed the view that this Administration and the current Secretary lack "credibility" on issues involving environmental regulation of energy development. We anticipate, therefore, some effort to write detailed regulations, lease terms and permit stipulations into law. It is ASRC's judgment that the Committee should resist these efforts. The history of development of the North Slope's energy resources clearly demonstrates that the regulatory regime must evolve and change as legal requirements change, as new problems emerge, and as new technology and engineering improvements are introduced. Writing detailed stipulations and permit conditions into the law will freeze and retard further developments in improving and refining the process whereby adverse effects on the environment and fish and wildlife are avoided, minimized or mitigated.

(g) Revenue Sharing

It is common knowledge among those who support opening the coastal plain that a necessary precondition is that broad based public benefit must result from a portion of the revenues to be derived from bonus bids and royalties on coastal plain leases. This apparently means that some exception may be made to the general formula under which the State of Alaska receives 90 percent of the revenues from public lands within the State. The 1980 Appropriation Act opening the NPR-A to competitive leasing, for example, provides precedent for granting the State less than 90 percent of leasing revenues.

We understand that the State of Alaska will oppose any such proposed exception or modification. We believe, however, that there is room for compromise on this matter. ASRC leaves a decision to the good judgment of the Governor, the Members of this Committee and the Congress.

Should the Committee adopt a revenue sharing provision, ASRC recommends that the Committee consider allocating a portion of the new Federal revenues for the following purposes:

-- funding the Land and Water Conservation Fund (as has been proposed by Senator Johnston in S. 735);

-- acquiring critical habitat for new and expanded wildlife refuges in the lower 48 states, especially in the Pacific Flyway Region;

-- implementing the North American Waterfowl Plan;

-- funding needed demonstration projects for improving energy conservation and for bringing alternative energy technology into the market place;

-- improving access to and providing needed visitor facilities in Refuge areas in Alaska and elsewhere;

-- providing impact aid to the North Slope Borough, Kaktovik Village, and other communities affected by coastal plain exploration and development activities; and

-- applying any balance over one billion dollars received in any fiscal year to reducing the national deficit.

(h) Prohibition on Export of Coastal Plain Crude Oil

It is ASRC's understanding that the provisions of existing law prohibiting the export of Alaska North Slope crude oil are also applicable to crude oil produced on the coastal plain. To avoid extensive debate on this emotional subject and to keep it separate from the coming debate over the energy provisions of the U.S.-Canadian Trade Agreement, we propose that language be included in S. 1217 which makes clear that the limitations and prohibitions in existing law concerning the export of North Slope oil also apply to any crude oil produced from the coastal plain.

We strongly oppose, however, any effort which may be made to extend export prohibitions to North Slope natural gas. The North Slope contains huge reserves of natural gas. We believe that the 4.6 million acres of land on the North Slope owned by ASRC and by our Villages contain significant volumes of a natural gas. Bringing these reserves to market will be very expensive. Limiting potential markets with an export prohibition will only increase the cost of producing North Slope gas and further delay development of this resource.

(i) Training to Upgrade Native Job Skills

ASRC recommends the authorization of a training program to develop and upgrade the job skills of the local Eskimo people. The training program would focus on skills needed for employment in the oil and related industries. It would also include training programs for regulation of oil industry activities as well as training programs related to providing the public services required by the industry as well as public and private visitors to the coastal plain.

This training program could be conducted at existing facilities at Prudhoe Bay. It should be open to residents of Arctic Village and other communities who have expressed concern that coastal plain development could impact their dependence on caribou for subsistence. Their concern has been greatly heightened by the lack of employment opportunities in or near these villages.

(j) Impact Aid to Kaktovik Village, the NSB and Other Affected Communities

The Eskimo people expect fair treatment from the Congress. They understand that many policy issues they support will be resolved against them. But they do want due process, fair treatment and equal protection.

The people of the Village of Kaktovik, other North Slope Villages and the North Slope Borough were, therefore, shocked during the August Congressional visits to hear a number of Members of Congress suggest they could not support impact aid for affected Eskimo Villages or for the North Slope Borough.

My people, according to these Members, should be treated different than people in other communities of America which bear the economic burden and social disruption of accommodating large scale energy developments of national benefit. Some Members would treat us different because:

-- our business for profit corporations have entered into contractual lease agreements on our lands in the coastal plain with U.S. energy companies; and

-- our local government has incurred debt, financed by taxes on Prudhoe Bay facilities, to develop a minimal system for police and fire protection, medical care, electricity, water and sewage.

As an officer of ASRC and as a member of the North Slope Borough Assembly, I find this attitude very disturbing.

ASRC supports the position of the North Slope Borough and Kaktovik Village on impact aid which we understand will be submitted to the Committee in the near future.

(k) Sadlerochit Springs Special Area

The Secretary should be authorized and directed to issue special regulations to govern activities at the Sadlerochit Springs Special Area. This authority could be broadened to include other areas of the coastal plain which may, in the future, be found to be of unique character and interest. Our recommendation here does not include the so-called "core calving area" which is discussed above.

(l) Utukok Special Management Area

ASRC recommends that the Committee legislatively establish a new 1.5 million acre Utukok Special Management Area in the western portion of the North Slope. Establishment of this area for wildlife management purposes by the Bureau of Land Management would add an equivalent amount of acreage to the nation's wildlife management systems as is proposed for oil and gas leasing in the coastal plain study area of ANWR. Establishment of the new Special Management Area would, or course, be subject to the 1980 Congressional policy concerning leasing, exploration and development in NPR-A.

ASRC also supports expanding ANWR by 325,000 acres as is proposed in H.R. 2629, the House passed Submerged Lands Bill.

(m) ASRC's and KIC's Private Lands in ANWR

ASRC and KIC own 92,160 acres of private lands within ANWR and within and adjacent to the coastal plain study area. Whatever policy the Committee adopts concerning competitive leasing for the coastal plain, we urge the Committee to remove the current prohibition against development of our lands and to permit ASRC and KIC to develop the economic potential of our private property. Second, we urge the Committee to grant ASRC and KIC the appropriate authorization for a pipeline and other needed rights-of-way if and when our lands are found to contain commercial deposits of oil, gas or other minerals.

(n) Exclude ASRC and KIC's Lands From ANWR Boundaries

ASRC recommends that the Committee exclude the Village of Kaktovik and our 92,160 acres of private lands from the exterior boundaries of ANWR. Our lands represent only 4/10 of one percent of the Refuge's total area of 19 million acres.

Our experience with inholdings occupied by our Villages in conservation system units is that at some point in time the Federal land managers impose unacceptable restrictions on the life style and customary activities of Village people. This has already occurred at Anaktuvuk Village which is located in the Gates of the Arctic National Park. It is probably inevitable that ANWR's wildlife managers will one day try to manage the people -- as well as the Wildlife -- at Kaktovik.

(o) Kaktovik's Subsistence Requirements

Section 288(b)(3) of S. 1217 makes clear that nothing in the Act limits or affects the applicability of the National Environmental Policy Act or applicable environmental laws to the postleasing (exploration and development) phases of coastal plain activity. ASRC recommends that language be included to make clear that where Environmental Impact Statements (EIS) on proposed exploratory or developmental activities are required, one section of the EIS specifically address potential impacts on the subsistence requirements and cultural traditions of the Eskimo residents of the Village of Kaktovik.

(p) Annual Report

ASRC recommends that language be added to S. 1217 to require the Secretary to report annually to the Congress on the status of the coastal plain leasing program. The report should be prepared in a manner which will assist Congress in conducting legislative oversight of the leasing program and the subsequent exploration and developmental phases of activity.

(q) Other Environmental Considerations

Should the Committee determine, on the basis of the record of this proceeding, that opening the coastal plain study area will require additional assurances of environmental protection and safe operation, we recommend the Committee review and consider two precedents from the Trans-Alaska Pipeline Act of 1973. The first is to consider establishing a standard of "strict liability" on coastal plain lease holders for any damages resulting from their operations and activities. The second is to consider establishing a "Coastal Plain Liability and Reclamation Fund," funded by a per barrel fee on commercial oil production from the coastal plain, until an appropriate level of revenue has accumulated in the Fund. The Fund's revenues would be available to compensate for any damages, to reclaim lands, to restore other North Slope lands disturbed by early governmental drilling programs, to conduct research, or such other purposes as the Committee determines are appropriate.

(r) General Provisions in S. 1217

While ASRC endorses S. 1217 with the modifications proposed above, a few provisions of the bill as introduced merit comment.

(i) The Independent Producer

Section 288(a)(3)(E) (page 7, line 19) directs the Secretary to make "reasonable efforts to conduct lease sales in a manner which will enable independent oil and gas producers . . . to have a competitive opportunity to successfully bid on leases . . ." within the coastal plain. As a small minority owned company active in the energy business, we endorse this provision. We recognize, however, that conducting oil development in the Arctic in conformity with stringent environmental requirements requires both experience and substantial capital. We recommend that the leasing regulations should address these issues.

(ii) Litigation and Delay

Section 288(b)(2) (page 9, line 8) provides that the Department's coastal plain report and legislative environmental impact statement (LEIS) satisfy all applicable legal requirements and provide an adequate basis for developing and implementing the competitive oil and gas leasing program within the coastal plain. ASRC supports this provision. No useful purpose is served by leaving the development and implementation of the competitive leasing program open to litigation and delay over the adequacy of the underlying documents. Congress has reviewed these documents and supplemented them with testimony. Congress will make the policy decision on the coastal plain study area. The Secretary should be free to implement the policy of the Congress without litigation and unnecessary delay over questions concerning the adequacy of the LEIS or the resource assessment report.

The Committee may wish to consider adding a requirement that litigation on Environment Impact Statements be initiated within ninety days of their issuance in final form. This was done in the 1980 Act authorizing the NPR-A leasing program.

(iii) Mutual Arctic Interests

Section 288(d) authorizes and encourages negotiations between the U.S. and Canada on a number of energy, environmental and economic issues in the Arctic region. We endorse this provision. The Alaska Eskimo Whaling Commission has very significant concerns about a proposed plan by a Canadian oil company to transport crude oil produced offshore in the Canadian Beaufort Sea by barge or tanker to an area west of Barrow for transhipment to Japan or Korea. Ice conditions pose significant risks and dangers to this proposed means of transport which goes through areas extensively used by Bowhead Whales and other marine mammals. This is an issue which should be made the subject of negotiations. Further, a joint study should be made of the feasibility of using overland Pipeline routes, including the TAPS line when the pipeline has excess capacity, for moving Canadian Beaufort Sea oil reserves to market.

Conclusion

Mr. Chairman, that concludes my testimony. Enactment of the legislative provisions we propose would serve the nation's long- and short-term interests. It would result in a balanced and responsible Arctic oil policy for the Nation. It will not resolve the Persian Gulf crisis, but it moves in the right direction. It will not win the support of hard core environmentalists, but it will assure safe and environmentally responsible development of the coastal plain's hugh oil potential. It will not represent the final treatise on caribou, but it will protect the fish and wildlife my people rely upon for subsistence every day of every year.

In conclusion, I want to comment on the evolution of this issue over the past year as seen by an Eskimo who lives on the top of the world. From November 1986 through early summer of 1987, the issue was the Porcupine caribou herd and the "core calving grounds" on the coastal plain. This year most caribou calved in Canada. The issue then shifted and became "industrial pollution". About the time of the Congressional visits, the issue became how the coastal plain fits into "national energy policy". More recently, the issue appears to be a stark choice between "wilderness" designation and a regulated and responsible development policy based on, and taking advantage of, prior North Slope experience.

We are now getting down to the real issues: the facts, the record of North Slope development, and the interests of the people of the United States.

These issues are now before this Committee for decision. This is where they belong. The Members of this Committee will have to sort out the relationships between the Persian Gulf, the Strategic Petroleum Reserve, declining domestic reserves, rising import dependency and the relationship of all of these issues to the domestic oil and gas potential of the coastal plain study area. You have to decide the future policy for the coastal plain.

On behalf of the Inupiat people, I appreciate your courtesy in hearing our views.

NORTH SLOPE BOROUGH
OFFICE OF THE MAYOR
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George N. Ahmaogak, Sr., Mayor

The Honorable J. Bennett Johnston
Chairman, Committee on Energy and
Natural Resources
United States Senate
360 Dirksen Senate Office Building
Washington, D.C. 20510

Re: S. 1217; ANWR Leasing Bill

Dear Mr. Chairman:

I regret that the Borough could not provide a witness to testify before your Committee at hearings scheduled for October 13-15, 1987, on Senator Murkowski's ANWR leasing bill. I appeared before your Committee on June 4, 1987, to support the opening of ANWR to leasing, subject to strict local government and environmental review requirements. The opening of ANWR to oil and gas exploration, development, and production would have an immense effect on the Borough, and we hold this issue as a highest priority.

As I understand it, your hearings are intended to invite recommendations for specific technical changes to Senator Murkowski's bill. In connection with our comments on S. 735, I submitted to you the enclosed recommendations for amendments to Congressman Young's ANWR leasing bill, H.R. 1082. (Enclosure I) Those comments apply equally to similar provisions of Senator Murkowski's bill. Therefor, I commend them to your attention. Additionally, I enclose our comments on the Interior Department's Draft and Final § 1002 Study, as background material for our recommendations. I will highlight here two of the issues that we feel must be addressed satisfactorily in your Committee's bill.

IMPACT AID

S. 1217 would provide a grant program for certain forms of impact aid. We think that Senator Murkowski's proposed section 288(c) of the Mineral Leasing Act is a good starting point for drafting an impact aid provision. Despite promises made in good faith by the Executive Branch in Alaska, you and we cannot rely on the Alaska State Legislature to redistribute funds ultimately allocated to it from the Treasury for local impact aid, such as was called for in the NPR-A Production Act.

The Borough and its Villages have already incurred, and will incur, costs due to the ANWR development proposal. These costs will continue before, as well as after, taxable real property, if any, is ever placed in the Coastal Plain or the Federal Government receives revenues from an ANWR lease sale. Therefor, those sources of funds will not be a timely source of impact aid.

The Congress has repeatedly recognized that it is acceptable public policy to directly fund local government impact aid. There are three reasons for this: (1) it is not proper to impose burdens on local governments and local taxpayers from mineral leasing on Federal lands; (2) Congress wants to make the counties whole for depriving them of a real property tax base and economic development by retaining land and resources in Federal ownership; (3) it helps defray the costs of local government services provided to the Federal government (search and rescue, hospitals, roads, police, schools). Examples of those Congressional policies are: Payment-in-lieu-of-Taxes Act (PILT); Refuge Revenue Receipts Act (RRRA); the Coastal Energy Impact Program (CEIP) and the Coastal Resource Improvement Program (CRIP), under the Coastal Zone Management Act; National Petroleum Reserve-Alaska (NPR-A) Production Act.

In our case, almost all our lands are Federal, and massive energy development has occurred on and offshore. Yet distributions to the Borough and Villages under other impact aid statutes have been paltry, either because of per capita caps on aid (PILT), entitlements based on net vs. gross receipts (RRRA), or recalcitrance by the State (NPR-A Act). Despite significant OCS drilling and other activity off our shores, no impact aid is provided by the OCS Lands Act, nor are the CRIP/CEIP programs being funded.

In short, unless the law is changed, local taxpayers will be bankrolling ANWR-induced demands for public services long before real property tax or leasing revenues, if any, are recovered from ANWR.

S. 1217 could be read as not taking away the Borough's present entitlement (from sand and gravel sales, sales of privileges, etc.) under the RRRA. However, we urge you to make it very clear in the Committee Report, if not the bill, that section 288(a)(7) of the Mineral Leasing Act, as created by S. 1217, would apply only to oil and gas lease revenues, and that this bill affirms the applicability of the RRRA, 16 U.S.C. § 715s(c)(2), to sales or charges for use of other products and privileges in ANWR.

Furthermore, we strongly urge that an impact aid provision be incorporated into the Committee's bill that provides for the following:

(1) direct entitlements of local governments to impact aid, administered through the Borough;

(2) include among the range of purposes for which grants may be made those recognized by other impact aid provisions: (a) studying and planning for mitigation of the potential environmental, social, cultural, and recreational, effects, and (b) studying, planning, developing, and carrying out projects and programs that provide new or expanded public facilities and services necessitated by the exploration of, and the development and production of oil and gas, and other minerals and materials from ANWR.

(3) grant payments should be made on a quarterly basis;

(4) funding of the appropriation from ANWR oil and gas lease-related receipts, once received.

We tentatively recommend the following specific bill language:

> (a) There is established in the Treasury of the United States an Impact Assistance Fund (Fund) for local governments of the North Slope of Alaska. The Fund shall consist of:
>
> (1) any sums hereby authorized to be appropriated to the Fund;

(2) sums covered into the Fund pursuant to subsection (c) of this Section.

All sums deposited to the Fund under this subsection are hereby appropriated, shall be available on a revolving basis without fiscal year limitation, and shall be distributed by the Secretary on a quarterly basis.

(b) The Secretary shall administer a local impact aid program providing financial assistance to communities in Alaska affected by the potential and actual exploration and developments of ANWR. Assistance shall be provided on a priority basis to the North Slope Borough, for purposes of (1) study and planning by local governments for mitigation of the potential effects on environmental, social, cultural, recreational, and subsistence values, and (2) of studying, planning, developing, and carrying out projects and programs that provide new or expanded public facilities and services, necessitated by the exploration for, and the development and production of, oil, gas, minerals and other materials from the ANWR Coastal Plain.

(c) From money received from sales, rentals, bonuses, royalties and permits, including interest charges, collected from, or related to, oil and gas leases authorized pursuant to this Act, the Secretary is authorized to allocate to the Fund such sums as he determines, in his sole discretion, are required to carry out the program set forth in subsection (b) of this section.

We offer this suggested language with the understanding that we are willing to consider changes and improvements.

AVOID
POSSIBLE PREEMPTION OF LOCAL GOVERNMENT ZONING AND ENVIRONMENTAL REVIEW REQUIREMENTS

In our comments on H.R. 1082, we objected to the fact that it waived other "land management reviews" and NEPA. Proposed sections 288(a)(4) and (b)(2) would do the same, although paragraph (b)(3) would preserve "all Federal and State environmental laws of general applicability to oil and gas operation and permitting."

We have supported waiver of the transportation and utility systems provisions of Title XI of ANILCA. We do not support waiver of ANILCA's subsistence review provisions or the Coastal Zone Management Act. These could be considered "land management reviews," waived by proposed section 288(a)(4). Recent Supreme Court decisions [1] lead us to insist that you make clear the fact that proposed section 288 is not intended to waive the requirements of the Coastal Zone Management Act or the subsistence provisions of ANILCA.

Proposed section 288(b)(3) preserves only federal and state environmental laws of general applicability. We must insist that the bill be changed to preserve the applicability of such local zoning laws as would apply in the absence of that waiver of laws. We ask that you leave the law where it stands today.

CONCLUSION

We hereby request that you provide us an opportunity to submit further comments on S. 1217. Additionally, we request that you invite our review of any bill hereafter proposed by Committee Staff or Members of the Senate that may be reviewed by your Committee as alternatives to S. 1217. Please contact on my

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[1] California Coastal Commission v. Granite Rock Co., 55 U.S.L.W. 4368 (1987); Hodel v. Village of Gambell, 55 U.S.L.W. 4355 (1987).

Please contact on my behalf Ronald G. Birch and William W. Garner, of Birch, Horton, Bittner, Pestinger and Anderson, Suite 1200, 1155 Connecticut Avenue N.W., Washington, D.C. 20036; phone (202) 659-5800.

Respectfully,

NORTH SLOPE BOROUGH

George N. Ahmaogak, Sr.
Mayor

ISSUES RAISED FOR THE NORTH SLOPE BOROUGH BY H.R. 1082

The North Slope Borough (NSB) supports the intent of H.R. 1082 to open the Arctic National Wildlife Refuge (ANWR) to oil and gas leasing. The support of NSB is conditioned on providing for adequate impact aid and establishing procedures that will protect the environment of the North Slope, conserve its natural resources, and avoid or mitigate impacts on subsistence uses. Listed below are proposed changes to H.R 1082 which, in NSB's view, would permit the legislation to achieve this objective.

- Impact Aid

Comment: Under the Mineral Leasing Act, 90% of federal revenues are paid back to the State of Alaska for distribution by the State legislature. 30 U.S.C. § 191. The Alaska legislature may do with those funds as it sees fit. H.R. 1082 does not alter the federal/state revenue-sharing formula because it relies on existing law.

Section 7 of H.R. 1082 authorizes "impact aid, planning advice, and other appropriate assistance to communities on the North Slope" to the extent required to ensure the availability of public services. However, appropriations are not authorized and no specific amount of assistance is referenced. Any impact aid beyond that provided under other federal programs, or at the discretion of the State legislature, would depend on Interior's requesting such aid in an annual (FY) appropriations bill and Congress' passing specific appropriations for that purpose. Language similar to section 7 of H.R. 1082 appears in the

National Petroleum Reserve, Alaska legislation, 42 U.S.C. § 6507. Because it is also subject to the appropriations process, it has not proved to be satisfactory. The National Petroleum Reserve legislation also imposes on Alaska the mandates contained in 30 U.S.C. § 191 to give priority in revenue-sharing to local governmental subdivisions actually impacted. 42 U.S.C. § 6508. NSB's experience with this legislation has not been satisfactory.

NSB recommends that impact aid be provided by a revenue-sharing formula that would pay funds directly to impacted communities. This would be accomplished by creation of a separate fund in the Treasury from which money would be appropriated directly to NSB. Ten per centum of oil and gas leasing revenues would be put into the fund for distribution to local governments, while 80% would go to the Alaska legislature. This approach saves for the federal government the 10% share it would otherwise obtain under existing law.

Proposal: Delete existing section 7 of H.R. 1082, replacing it with the following:

> Sec. 7. There is established in the Treasury of the United States an Impact Assistance Fund for the North Slope of Alaska. Ten per centum of all money received from sales, bonuses, royalties and permits, including interest charges, collected in connection with activities authorized pursuant to this Act shall be covered into the Impact Assistance Fund; 80 per centum thereof shall be paid to the State of Alaska; and the balance thereof shall be credited to miscellaneous receipts. Monies covered into the Impact Assistance Fund shall be paid to the North Slope Borough for redistribution to impacted communities within the boundaries of the North Slope Borough, including the North Slope Borough and other such communities, as

> required to ensure the availability of public services needed to accommodate oil and gas exploration, development, production and transportation in the Coastal Plain. Monies conveyed into the Impact Assistance Fund shall remain available until expended without further appropriation.

- Input of NSB to Leasing Process

Comment: Section 3 of H.R. 1082 declares it to be national policy to lease for exploration and production the oil and gas resources of Arctic National Wildlife Refuge. Section 5 authorizes the Secretary of the Interior (Secretary) to issue leases for oil and gas under existing laws. H.R. 1082 would thereby lift the prohibition of section 1003 of the Alaska National Interest Lands Conservation Act (ANILCA), 16 U.S.C. § 3143, and would open ANWR to oil and gas leasing under the Mineral Leasing Act of 1920, 30 U.S.C. § 181 et seq.

H.R. 1082 does not provide for consultation of state and local governments, but rather refers generally to existing laws. At least three other federal laws establish consultation requirements: the Coastal Zone Management Act (CZMA), 1/ the National Environmental Policy Act (NEPA), 2/ and ANILCA. 3/ However, section 5(d) of H.R. 1082 would override these

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1/ 16 U.S.C. § 1451 et seq.

2/ 43 U.S.C. § 4332.

3/ ANILCA § 810, 16 U.S.C. § 3120, and see ANILCA § 1008, 16 U.S.C. § 3148, which requires consultation with Native corporations respecting oil and gas leasing, but which, by its terms applies to all Alaska oil and gas lands except ANWR, other "conservation system units" and lands north of latitude 68°.

requirements. Section 5(d) makes H.R. 1082 the "primary land management authorization" for ANWR and states:

> No land management review shall be required except as specifically authorized by this Act.

Further, section 6(b)(1) exempts any rules and regulations for leasing or "particular lease sales" from any further NEPA review.

To assure NSB input to the leasing process, H.R. 1082 should be modified. ANILCA contains broad consultation and review requirements for any oil and gas leasing in Alaska. Modifications to H.R. 1082 should be consistent with ANILCA in this respect, and suggested amendatory language tracks ANILCA requirements to the extent practical. The amendments suggested provide for consultation with NSB at each stage of the leasing process and require an ANILCA § 810-type finding (without requiring a study) regarding subsistence impacts.

Proposal: Amend subsection 5(d) by adding the following paragraphs:

> 1. Prior to adopting any rules or regulations to implement this Act and prior to issuing any leases authorized by this Act, the Secretary shall seek the views of the Governor of the State of Alaska, Alaskan local governments, Native Regional and Village Corporations and the Alaska Land Use Council respecting said rules, regulations or leases.
>
> 2. Prior to any exploration activities on a lease issued pursuant to this Act, the Secretary shall require the lessee to describe exploration activities in an exploration plan. The Secretary shall

furnish a copy of such plan to the State of Alaska, to local governmental entities, and to any Native Regional and Village corporations whose lands may be affected. The Secretary shall approve such plan if such activities can be conducted in conformity with such requirements as may be made by the Secretary for the protection and use of the land as a wildlife refuge and to avoid or minimize any adverse impacts upon subsistence uses and resources resulting from such activities.

3. Subsequent to a discovery of oil or gas in paying quantities, and prior to developing and producing such oil and gas, the Secretary shall require the lessee to describe development and production activities in a development and production plan. The Secretary shall furnish a copy of such plan to the State of Alaska, to local governmental entities, and to any Native Regional and Village corporations whose lands may be affected. He shall approve such plan if activities may be conducted in conformity with such requirements as may be made by the Secretary for the protection and use of the land as a wildlife refuge, for conservation of oil and gas and other natural resources, and to avoid or minimize any adverse impacts upon subsistence uses and resources resulting from such activities.

4. The Secretary shall monitor the performance of the lessee and, if he determines that due to significant changes in circumstances regarding that operation, including environmental or economic changes, new requirements are needed, he may require a revised development and production plan.

5. If the Secretary determines that immediate and irreparable damages will result from continuation in force of a lease, that the threat will not disappear and that the advantages of cancellation outweigh the advantages of continuation in force of a lease, he shall suspend operations for up to five years. If such a threat persists beyond

> such five-year suspension period, he shall cancel the lease and provide compensation to the lessee under such terms as the Secretary establishes, by regulation, to be appropriate.

- Lease Stipulations

Comment: H.R. 1082 does not require that the Secretary accord subsistence issues any preference in leasing actions. Section 810 of ANILCA, in addition to requiring a subsistence review, allows impairment of subsistence resources only if a determination of no reasonable alternative is made. Section 6 of H.R. 1082 should be amended to engraft the ANILCA section 810 criterion. Such a change would, for example, remove such objectionable proposals as Interior's stipulation no. 21, which prohibits hunting within five miles of oil facilities.

Proposal: Amend section 5(e) by adding the following after the last sentence:

> No such activities shall be authorized and no such conditions or restrictions shall be imposed which would significantly restrict subsistence uses, including subsistence hunting, unless the Secretary makes the determination required by section 810(a)(3) of Pub. Law No. 96-487.

- Control of Activities on Privately-Owned Lands

Comment: Section 5(f) of H.R. 1082 authorizes the Secretary to permit oil and gas leasing and related activities "on private lands within and/or adjacent to" ANWR under reasonable rules and regulations. This should not be read as extending federal authority not now in existence over private lands. For example, lands owned by individual Alaska Natives or Native corporations should not, as a result of this section, be subjected to federal regulation. The subsection should therefore be deleted.

Section 5(f) could legitimately be used to allow the Secretary to include private surface lands within a unit development, for example, if the owner agreed, or to regulate privately-owned mineral rights where the surface is also privately owned, 4/ if the surface owner agreed. If the subsection were so limited, NSB would not object to it.

No standards or criteria are provided in section 5(f). Because subsections (d) and (e) of section 5 apply to all activities under section 5, the standards of these subsections, as amended above, would arguably also apply to activities authorized by section 5(f). To avoid any ambiguity, the wording of section 5(f), if it is retained, should be modified. In addition, a proviso should be added to make clear that private lands can be regulated only with the owner's consent.

Proposal: Modify the language of section 5(f) of H.R. 1082 to read as follows:

> (f) The Secretary is authorized to permit, subject to reasonable rules and regulations

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4/ Pending before the Secretary are proposals to exchange federal mineral rights in certain areas of ANWR for lands and other things of value outside of ANWR. If such exchanges are approved, the surface estate of ANWR will remain in federal ownership with private owners (Alaska Native Corporations) obtaining mineral rights. A federal regulatory handle would remain both through federal surface ownership and, it is assumed, reservations in the exchange conveyances.

> and consistent with the procedures and criteria established in subsections (d) and (e), on lands within the Coastal Plain all activities described in subsection (b) by owners of private lands within and/or adjacent to the Coastal Plain and the Arctic National Wildlife Refuge: Provided, That this subsection shall permit the Secretary to regulate activities on private lands only with the consent of the owner of such lands.

- Access Rights and Subsistence Use

Comment: H.R. 1082, as previously noted, arguably exempts ANWR oil and gas leasing from section 810 of ANILCA. It is not clear whether section 811 of ANILCA would also be affected. H.R. 1082 should be amended to preserve access and subsistence rights to lands that may be adjacent to leased areas or may be affected by oil and gas leasing activities. Language used for this purpose should, for the most part, track section 811, but also should reflect modified language to include use of classes of motorized vehicles that are now in dispute.

Proposal: Amend section 6 of H.R. 1082 by adding the following new subsection:

> (c) The Secretary shall ensure that rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on the public lands affected by this Act. The Secretary shall permit on the public lands, subject to reasonable regulation, appropriate use for subsistence purposes of snowmobiles, motorboats, or other means of surface transportation employed for such purposes by local residents as of the date of enactment of this Act.

- Preemption of Local Control

Comment: Section 5(d) of H.R. 1082 could be interpreted as preempting state and local jurisdiction over land management decisions. NSB's zoning authority could be affected. To make clear that the Secretary does not have preemptive jurisdiction, a disclaimer should be added to the bill.

Proposal: Amend section 5 of H.R. 1082 by adding a new subsection to read as follows:

> (h) Nothing contained in this Act shall be construed to alter, limit, modify or affect the authority or rights of any State or local governmental entity in lands affected or over activities authorized by this Act.

- Local Hire

Comment: H.R. 1082 contains no local hire provisions, which can be remedied by adding ANILCA's local hire program.

Proposal: Add to section 6(a), at the end of the last sentence, the following:

> In promulgating such stipulations, rules, and regulations, the Secretary shall comply with section 1308 of Pub. Law No. 96-487.

- Other Resource Revenue

Comment: Federal revenues from resources other than oil and gas would normally be shared with county governmental entities. A savings clause should be included in H.R. 1082 to preserve this benefit.

Proposal: Add to section 7 a subsection reading as follows:

> Nothing in this Act shall be construed to preclude the applicability of the Refuge Revenue Receipts Act, 16 U.S.C. § 715s, to resources of the Coastal Plain other than oil and gas.

- Effects on Bowhead Whales

Comment: Whaling is one of the most important social and cultural activities of the Inupiat peoples. The Marine Mammal Protection Act and the International Whaling Convention prohibit commercial harvesting of bowhead whales, and North Slope Natives are afforded an exemption for subsistence takings. 16 U.S.C. § 1371(b). The bowhead is, nevertheless, an endangered species whose continued survival is threatened by noise, maritime vessel traffic, depletion of its food sources, and obstruction or interference with migration routes. Increased tanker and other maritime vessel traffic is anticipated from development of oil and gas from ANWR. H.R. 1082 should authorize the Coast Guard, in cooperation with the Secretary of Commerce to promulgate regulations to control vessel traffic in United States waters during whale migration seasons in order to minimize impacts on the bowhead whales. An amendment for this purpose is proposed.

One of the greatest threats confronting the bowhead is caused by maritime vessel traffic to and from the Canadian North Slope. Authority exists for the Secretary of Commerce, through the Secretary of State, to negotiate an agreement to mitigate such impacts. 16 U.S.C. § 917c. Congress should urge that the Executive Branch take action in this regard under existing law.

Proposal: Add a new section to H.R. 1082 to read as follows:

> Sec. 8. The Secretary of the Department in which the Coast Guard is operating, in consultation and cooperation with the Secretary of Commerce, is authorized and directed to adopt regulations for the purpose of eliminating, reducing or mitigating impacts of maritime vessel traffic on marine mammals and on subsistence activities relating to marine mammals.

NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

Incorporated July 2 1972

January 20, 1987

Director
U.S. Fish and Wildlife Service
Division of Refuges
18th and "C" Streets, N.W.
Room 2343, Main Interior Building
Washington, D.C. 20240

Re: ANWR LEIS

Dear Sir:

These are the detailed comments of the North Slope Borough on your "Draft Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment" and Legislative Environmental Impact Statement (LEIS). Incorporated herein by reference are the statements presented on my behalf by the Borough at the public hearings held in Kaktovik, Alaska and Washington, D.C. on January 6 and 9, 1987.

I believe that ANWR should be opened to oil and gas leasing, subject to stringent environmental, subsistence, local access, and public participation requirements. I also believe that if Congress adopts Alternative A in the LEIS, as recommended by Assistant Secretary Horn, the "core" calving area of the porcupine caribou herd--located in the south end of the Jago River area of ANWR--should be placed off limits to leasing for a period of time.

My views on the larger issues facing Congress, in deciding whether to open ANWR to leasing, were outlined in my statements at the hearings. I have attached comments on the specific strengths and weaknesses in the draft LEIS. I observe generally that the document is weak in the following general areas:

1) The effects on coastal resources (especially whales and fish) from development and shipping at port and waterflood sites;

Enclosure II

2) The cumulative effects that ANWR and other developments will have on fish and wildlife, on demands for Borough services, and on lifestyles and subsistence opportunities;

3) There is no description of the specific procedures that you will recommend to Congress to guarantee that local governments and residents will be involved in federal decision-making concerning exploration and development, mitigation, subsistence, and transportation and utility systems;

4) You propose no mitigation measures to avoid your projected loss of subsistence areas to (a) development and (b) hunting restrictions; and

5) There is no indication of how you propose to coordinate your administrative procedures with decision-making under the Borough's zoning jurisdiction.

Thank you for this opportunity to comment on the ANWR LEIS. Under separate cover, we are providing certain of the maps, previously provided to your staff in Anchorage, that we feel are especially informative as to human uses of ANWR.

Sincerely,

George N. Ahmaogak Sr.
Mayor

cc: Senator Ted Stevens
Senator Frank Murkowski
Loren Ahlers, Mayor of Kaktovik
Kaktovik Inupiat Corporation
Jacob Adams, President, ASRC
Robert Grogan, State of Alaska
U.S. Fish & Wildlife Service, Anchorage
North Slope Borough Assembly
NSB Planning Commission
William Garner ✓
Edward Itta, Director, NSB Planning Department
Harold Curran, NSB Attorney
Warren Matumeak, NSB Land Management Administrator
Ben Nageak, Director, NSB Wildlife Management

COMMENTS OF THE
NORTH SLOPE BOROUGH
ON THE
DRAFT ANWR LEIS
JANUARY, 1987

Generally speaking, we think that the Draft LEIS is concise, well written, and predicts well the impacts of potential oil and gas development on terrestrial wildlife. However, it discusses in far less detail the existing fishing, hunting, and whaling locations, and the needs of the various Native groups that use ANWR and the Porcupine Caribou Herd (PCH). It does not present alternative development scenarios for coastal and riparian zones that might be dictated by the need to protect subsistence sites.

We also feel that since neither developments nor mitigation stipulations can be predicted with precision until concrete exploration or development plans are presented, the LEIS should have devoted more attention to the procedures that the Secretary will recommend to Congress for involving the public in your Department's process for making zoning and mitigation decisions for ANWR. Those procedures should incorporate ANILCA Title VIII and XI procedures. They should emphasize coordination with local and State decision-making respecting similar or integral development of

Kaktovik Inupiat Corporation (KIC) lands, Native inholdings now being acquired, and State lands--both submerged lands within and offshore of ANWR, and those to the West of ANWR.

I. ACCESS

The LEIS addresses access on pages 127-129. The LEIS does state that subsistence hunting would be restricted in the vicinity of oil and gas facilities. Mitigation stipulation No. 21, Page 146, proposes a five- mile restricted access area adjacent to oil and gas facilities, producing major adverse effects by limiting access to resources and areas traditionally harvested. As noted at p. 132, if there were to be no hunting or trapping within five miles of development areas, full leasing (Alternative A) would result in the loss of over one half of the hunting area within the 1002 lands. This would be a major impact on subsistence activities (see p. 9).

The restrictions of this type imposed in various Units on the North Slope, are inconsistent. A restriction similar to No. 21 currently exists only in Prudhoe Bay, with no discharge of firearms allowed in the Prudhoe Bay Unit at all. There are no such restrictions at Kuparuk. A five-mile restriction currently exists on either side of the Trans-Alaska Pipeline System, but only for the discharge of firearms. However, enforcing this restriction is difficult at best due to lack of adequate personnel and vehicular means to enforce the prohibition. Uncertainty of local residents at Nuiqsut over what restrictions apply has itself tended to discourage subsistence activities.

Stipulation No. 21 is grossly overbroad. Hunting restrictions for property protection should be deferred until specific developments are proposed. Before leasing, we must enter into agreements regarding such questions as rifle calibers and types of development, etc., that could be used in the vicinity of oil and gas facilities.

Moreover, with traditional subsistence areas rendered unavailable, due both to potential displacement of wildlife and to hunting restrictions, you should consider mitigation of subsistence effects, in the form of sport hunting restrictions. Subsistence use by local residents is a priority use over other consumptive uses in ANWR. 50 C.F.R. 36.11(c) (1985). The haul road experience suggests that "sport" hunting is highly concentrated along roadways, and is largely unpoliced. This could well occur along roadways in ANWR, to the detriment of subsistence opportunity.

As proposed, industrial development (port construction) is likely to have a major impact on subsistence whaling if sea traffic is not controlled. (See Part III, below). The noise and traffic associated with 1 or 2 ports near Kaktovik will be a far different matter from the occasional disturbance now produced by passing vessels.

There is little mention of the ANILCA Section 810 process. Section

810 (a)(3) of ANILCA requires that, prior to leasing federal land under any provision of law, the responsible federal agency must determine, at a minimum--

1) that any significant restriction of subsistence use is necessary,
2) that the proposed action uses the minimal amount of land necessary to accomplish such use, and
3) that reasonable steps will be taken to minimize adverse impacts upon subsistence use.

In addition to the foregoing recommendations regarding hunting restrictions, we suggest that at least the following be considered:

A) The LEIS should address and Congress should consider those factors outlined in ANILCA Section 810. This would require considerable further recitation of sociocultural research to satisfy Section 810 (a)(3). (See Attachment A)

B) Since Kaktovik residents have stated that the biological studies associated with the ANWR evaluation process have been somewhat disruptive, measures must be taken to coordinate programs (such as the LGL bowhead feeding study) so as to not disrupt subsistence activities.

C) There should be a full listing of the villages (U.S. & Canadian) that use the PCH.

D) The LEIS must recommend to Secretary Hodel specific legislative language providing for full local government and resident participation in the federal processes for mitigating and approving (1) exploration or development plans, (2) transportation and utility systems, including roads, pipelines, docks and ports, (3) proposals to zone areas off-limits to development, (4) restrictions on subsistence and non-subsistence access. The subsistence users must be fully apprised well before development plans are decided. Such briefings should clearly explain the significance of the development for continued subsistence hunting, and for possible socioeconomic and cultural disruptions.

E) The document should state how subsistence-related mitigation stipulations will be enforced and how the public can be involved in their enforcement.

F) The government should be authorized to control seasonal sea traffic to and from the ANWR docking facility.

G) The port alternative east of Kaktovik would be far more likely to interfere with whale feeding and hunting than would the alternative site near Camden Bay.

H) The Borough provided your staff with maps, not used in the

LEIS, that describe stream reaches and the inland subsistence sites used for fishing. These should guide facility siting and water withdrawal decisions, just as caribou calving areas have, and more precise maps should be used in the Final LEIS.

II. COMPARING CENTRAL ARCTIC AND PORCUPINE CARIBOU HERDS

Any attempt to extrapolate to the PCH as it may be impacted by ANWR leasing, the apparent success of the Central Arctic Herd (CAH) near Prudhoe Bay should note the following points.

1) The CAH has not had a population decline, in part, because a) the CAH has only been displaced from a part of its calving ground, b) there seems to be plenty of habitat for the CAH, and c) the density of the CAH on their calving ground is low (p. 108).

2) The density of the PCH on the calving grounds is about 14 times the density of the CAH calving grounds. (p. 108). This means that the very large PCH is "packed into" its calving area, while the very small CAH has "plenty of room" on its calving grounds .

3) Full ANWR development could potentially displace the PCH from 32% of their most critical core calving area (p 108).

4) Because of the much greater density of PCH on their calving grounds, the PCH will interact much more extensively with oil development in ANWR than has the CAH near Prudhoe Bay (p 106).

III. IMPACTS ON WHALES AND FISH

Kaktovik whalers have voiced serious concerns regarding the adverse effects of marine traffic on their hunting success. The fundamental importance of subsistence activities to the proper functioning of the Inupiat family and community is not clearly stated or well referenced. See the Attachment A for a listing of pertinent sources.

The brief description at p. 119 of the "Impacts" to bowhead whales is inadequate and does not mention that the marine waters off ANWR appear to be a major bowhead feeding area. (See attached Figure 1). This section must also be strengthened to recognize that noise disturbance from one or more port facilities is likely to be much more significant than reactions of individual whales to noise sources reported in other studies. The conclusion (p. 119) that there would only be minor behavioral changes is premature and not supported.

Any discussion of potential ANWR impacts to bowhead whales must take into consideration how ANWR activities are likely to influence further development at Point Thomson and in the offshore area adjacent to ANWR.

If a pipeline and roads extend into ANWR, such "infrastructure" will make development of nearby offshore prospects much more likely. This is especially important since the nearshore area from Camden Bay to the Canadian border is already of great interest to the industry and the same waters appear to be important feeding habitat for the bowhead.

Disturbance studies have not shown conclusively that bowheads will habituate to vessel traffic. The statement on p. 119 that "long-term behavioral effects from noise and vessel disturbance have not been demonstrated or measured" may be an overstatement. Studies in the Canadian Beaufort have shown a steady decrease since 1980 in the use of the "industrial zone" during exploratory activities (Richardson, et al. 1985). Additionally, the effects of short term disturbances are not conclusive, as the authors point out on p. 119. A port facility may have considerable effects on whale distribution (avoidance of marine traffic) and certainly on hunting success, particularly if a major sea lift was delayed into late August or September because of bad ice conditions.

The areas used in subsistence whaling activities extend beyond those outlined in the LEIS. The region used extends west to 144°, east to 143° 30', and 25 nautical miles seaward.

In addition to the effects of causeways, recited at p. 125, you should note that several studies have documented causeway-induced (solid fill) changes to the nearshore temperature and salinity regimes (Moulton et al. 1985:, Envirosphere 1985). Such changes reduce suitable feeding habitat

(Neil, et al. 1983). Numerous proposed or existing causeways used for docking facilities and accessing nearshore oil fields may have measurable effects on anadromous fish populations (Craig 1984). For instance, this may prevent the recruitment of young arctic cisco to the Colville River (Gallaway et al. 1983).

The effects of leasing the Coastal Plain must be considered cumulatively with the likely additional leasing of adjacent state, Native and federal lands. The Coastal Plain borders on three offshore State Lease Sales (50, 51, and 55), and Federal Lease Sale 97. If developed, these will effectively "seal off" the Village of Kaktovik and potentially industrialize the Eastern U.S. Beaufort coast. Also, marginal fields, (e.g., Point Thomson) may become economically viable once access is established into the Coastal Plain.

Accordingly, we recommend that the Final LEIS contain a more pointed analysis of the effects that docks, waterflood facilities, and related shipping traffic and industrial support facilities can have, in terms of obstruction and noise, on subsistence activities, fish, whales, the coastal environment, and Inupiat lifestyles and culture. There should be more specifics, at p. 125, on the design of causeways, docks and waterflood facilities to mitigate their cumulative effects.

Overwintering fish habitat deserves special attention. Water is very limited on 1002 lands and serious conflicts will most likely arise regarding water usage for both exploration and development. As noted previously in the discussion, these areas of access should be better documented. The NSB provided your staff good maps for this purpose. Entire stream populations of arctic char or grayling could be destroyed by dewatering such areas, especially during winter months when many portions of a stream or river may be frozen completely to the stream bed.

There must be established a "Technical Review Committee", modeled after the Endicott T.R.C., to monitor local and cumulative impacts to fish, and to recommend mitigation when needed. Information from the most recent studies of the Endicott Environmental Monitoring Project, the West Dock Causeway, and the Lisburne Project should be incorporated continually into the design of mitigation measures outlined for this study.

IV. MITIGATION OF CONSTRUCTION ACTIVITIES

Wetland Loss To Leachates - Enforcement of wetland loss due to reserve pit contents leaching through or spilling over the pit dikes onto wetlands should be addressed in the LEIS.

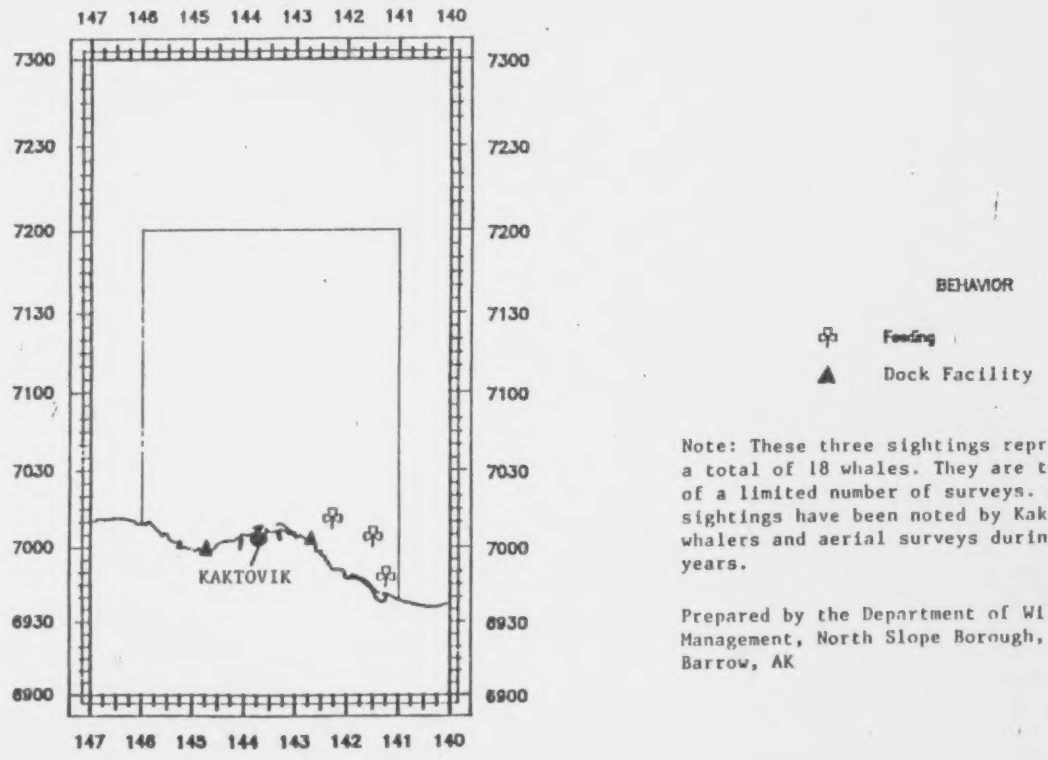
Based on our experiences in the Prudhoe Bay, Kuparuk River and Milne Point oil and gas units, use and maintenance of reserve pits can and has caused concerns with respect to pit contents spilling onto the tundra.

For example, drill muds and cuttings placed into the pits as an allowed practice provided that they are not contaminated with hydrocarbons. And yet not only hydrocarbons but crude oil has been discovered in the pits. And when they are allowed to overtop or are breached, the contents, including the hydrocarbons and crude oil escape onto the tundra.

Additionally, reserve pits are often used for the disposal of snow in the winter and if not managed so as to disperse the snow evenly in the pit, overtopping of the pit can occur in the spring when the snow melts and fills the pit. If flowlines and other pipelines are constructed around the pit such that pipeline construction prevents the maintenance of the pits with the use of machinery such as "cats", the walls of the pits can breach or be eroded out and spill their contents out onto the tundra. This is an issue that should be addressed in ANWR and proposed regulations.

FIGURE 1. Locations of bowhead whales feeding near ANWR. The sourse of these data are D. Ljungblad surveys[1] conducted for the Minerals Management Service.

Bowhead Feeding Locations (1979–1983)


147
146
145
144
143
142
141
140
7300
7230
7200
7130
7100
7030
7000
6930
6900
KAKTOVIK
BEHAVIOR
Feeding
Dock Facility

Note: These three sightings represent a total of 18 whales. They are the result of a limited number of surveys. Additional sightings have been noted by Kaktovik whalers and aerial surveys during subsequent years.

Prepared by the Department of Wildlife Management, North Slope Borough, Box 69, Barrow, AK

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1. See references (Ljungblad et al. 1984)

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NORTH SLOPE BOROUGH
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George N. Ahmaogak, Sr., Mayor

January 23, 1987

Director
U.S. Fish & Wildlife Services
Division of Refuge
18th and C Streets, N.W.
Room 2343 Main Interior Building
Washington, D.C. 20240

Dear Sir:

In addition to the comments we submitted on January 20, 1987, I would also like to submit the following comments regarding Native allotments of the Kaktovik residents.

The main concern of the Kaktovik residents is to preserve the subsistence resources and availability of those resources. Development of the 1002 area, as far as the residents of Kaktovik are concerned, is a secondary priority behind subsistence.

Native allotments are an important factor in a subsistence way of life. There are approximately 43 Native allotments for which Kaktovik residents have applied. Most of the applicants have not received title to these allotments from BLM and are still waiting approval. Most of these applicants use their pending or approved allotment areas for subsistence campsites to allow them to harvest food for their winter supply. We urge the Secretary of the Interior to resolve the pending Native allotment applications prior to the opening of ANWR for oil exploration and development. (Please see the attached Native allotment map).

There are also a few subsistence campsites that have not been applied for that are currently used for harvesting fish and other animals. These campsites are traditionally used by individual Kaktovik residents and should also be protected.

Sincerely,

Edward Itta for
George N. Ahmaogak, Sr.
Mayor

Enclosure III

Attachment

cc: Senator Ted Stevens
Senator Frank Murkowski
Loren Ahlers, Mayor, Kaktovik
Kaktovik Inupiat Corporation
Jacob Adams, President, ASRC
Robert Grogan, State of Alaska
U.S. Fish & Wildlife Service, Anchorage
North Slope Borough Assembly
NSB Planning Commission
William Garner
Edward Itta, Director, NSB Planning Department
Harold Curran, NSB Attorney
Warren Matumeak, NSB Land Management Administrator
Ben Nageak, Director, NSB Wildlife Management

NORTH SLOPE BOROUGH

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

Incorporated July 2, 1972

May 27, 1987

Honorable Frank Dunkle
Director, U.S. Fish and Wildlife Service
U.S. Department of the Interior
18th and C Streets, N.W.
Room 2343 Main Interior Building
Washington, D.C. 29240

Re: ANWR Final LEIS

Dear Mr. Dunkle:

The North Slope Borough has completed its review of the "Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment - Report and Recommendation to the Congress of the United States and Final Legislative Environmental Impact Statement". Comments on the Draft LEIS were submitted in two (2) separate letters dated January 20, 1987 and January 23, 1987.

In the Borough's January 20, 1987 letter to you, I identified five (5) major weaknesses of the Draft LEIS. Those concerns are summarized as follows:

1. The effects on coastal resources (especially whales and fish) from development and shipping at port and waterflood sites.

2. Cumulative impacts of the ANWR leasing, with other impending projects, on the North Slope Borough: fish and wildlife resources, demand for Borough service, and impacts on lifestyles and subsistence opportunities.

3. Procedures for local government involvement in ANWR development issues.

4. Lack of mitigation for loss of subsistence areas due to development and hunting restrictions.

Enclosure IV

5. Coordination of USF&WS administrative procedures with Borough zoning and permitting jurisdiction.

The second letter, dated January 23, 1987, addressed Native Allotments for Kaktovik residents seeking a prompt resolution of pending claims for Native Allotments.

While we support Alternative A, we do not believe that the document addresses all of our concerns nor does it propose a solution to Congress through proposed legislation.

With respect to the above issues, I offer the following comments on each issue:

1. Effects on coastal resources - The primary focus of this concern is on bowhead whales and fish. The Final LEIS continues to offer no substantive discussion on impacts to bowhead whales resulting from ship activity and noise. The conclusion that there would be only minor behavioral changes to bowhead whales continues to be premature and unsupported.

   The effects of causeways on fish has not adequately been addressed. The Final LEIS concludes that development near port sites would have minimal impacts to coastal fish populations. This is unsupported and therefore inappropriate to conclude in a document intended for Congressional consideration. Current studies of the effects of causeways on coastal fish populations are on-going at West Dock and Endicott, as well as at the proposed Lisburne causeway site.

   Recommended mitigation for both the bowhead and fish populations should be based on more than industry experience. (See p. 118, 3rd paragraph of Coastal and Marine Environment, Final LEIS). As we also noted in our Draft LEIS comments, we recommend that a "Technical Review Committee" be established modeled after the Endicott Technical Review Committee to monitor local and cumulative impacts to fish, and to recommend mitigation when needed.

2. Environmental Effects - While additional information has been presented regarding potential impacts on fish and wildlife, lifestyles, including subsistence, it does not appear that there is much new information with regards to mitigation. For example, we see a new section on projects that could have cumulative effects in ANWR, but no treatment of mitigation of those effects.

   It is almost certain that ANWR development will lead to a substantial increase in demand for Borough services. The Borough should not be expected, nor can it, carry this burden alone. Indeed, even now, Borough planning for ANWR development has demanded a substantial commitment of Borough resources. We are disappointed that the Secretary did not respond positively to our recommendation that Congress make available impact funds to the North Slope Borough. I therefore request his personal commitment to sponsor and pursue before the Congress the impact aid provision that I submitted to Secretary Horn.

3. Local government involvement in federal decision - making - I consider it imperative that the USF&WS develop and recommend to Congress a set of procedures, in consultation with the Borough, that will be used to ensure that the North Slope Borough will be intimately involved in all decision-making process regarding ANWR development. This should include the infrastructure required to support exploration and development, mitigation measures, subsistence, and transportation systems.

4. Mitigation of loss of subsistence areas - The Final LEIS states, as did the Draft LEIS, that subsistence areas will be lost. However, no meaningful mitigation is offered to compensate the local residents of Kaktovik for areas traditionally used for subsistence.

   This is an extremely important issue to me that must be addressed in a satisfactory manner. The prohibition of use by local residents of corridors, with no mitigation, is unacceptable to the Borough. Additionally, hunting should not be prohibited entirely from these corridors. It is my belief that hunting can be safely conducted without risk to property or life if rifle calibers are restricted to a maximum of .243 and that all shooting be conducted in a direction away from structures. Outside of a 5-mile corridor calibers and direction would not be restricted.

   Additionally, the area referred to as the "core calving area" should be protected to the maximum extent practicable. While caribou do not always use this "core" area for calving it is important to ensure that the Porcupine Caribou Herd is not subjected to undue hardship from development.

5. North Slope Borough Zoning Jurisdiction - No mention is made in the Final LEIS indicating that the Borough's exercises zoning authority within ANWR. As the Borough has done since the adoption of its Land Management Regulations in January 1983, development within ANWR will be subject to the acquisition of a North Slope Borough permit. Accordingly, I feel that the Final LEIS and the Secretary's position on the ANWR legislation should advocate no changes to the North Slope Borough permitting and zoning authority and that you advocate continued Borough permitting and zoning authority, which we feel currently exists.

6. Native Allotments - As mentioned in the Mayor's January 23, 1987 letter, there are approximately 43 Native Allotments for which Kaktovik residents have applied. It is especially critical that these applications be acted upon in a timely fashion and before any portion of ANWR is opened to exploration and development. The potential leasing of ANWR has been a factor delaying the already over-delayed conveyancing of allotments. The government should not be allowed to make decisions about the surface use of allotments in which, by law, the allottees have an executory interest.

   There are also several subsistence campsites which are used by local Kaktovik residents that have not been applied for, and these also require protection.

In summary, we do not feel that the concerns discussed above have been adequately dealt with in the Final LEIS, especially given that they were all discussed in our comments on the Draft LEIS. We believe that these concerns are legitimate and therefore deserve proper and careful consideration prior to your making a recommendation to Congress with respect to Alternative A.

Thank you for this opportunity to comment on the ANWR Final LEIS. We look forward to hearing from you regarding our comments.

Sincerely,

George N. Ahmaogak, Sr.
Mayor

cc: Senator Ted Stevens
Senator Frank Murkowski
Mayor Loren Ahlers, City of Kaktovik
Kaktovik Inupiat Corporation
Jacob Adams, President, ASRC
Robert Grogan, State of Alaska
U.S. Fish & Wildlife Service, Anchorage
North Slope Borough Assembly
NSB Planning Commission
William Garner
Warren Matumeak, Director, NSB Planning
Tom Barnes, Manager, NSB Permitting Division
Ben Nageak, Director, NSB Wildlife Management

The CHAIRMAN. Mr. Leavitt, let me interrupt you there, if you do not mind, because I have read this statement. I want to ask you some things about it.

You speak of the land use requirements. How should those land use requirements be built into this bill? Have you thought about what we should do in terms of legislation, and if your counsel would like to chime in, we would be glad to hear from him or from you or both of you.

Have you thought about that—I am persuaded that a land use plan is very important, but how do we put it into this legislation?

Mr. LEAVITT. Well, Mr. Chairman, in the interests of time, let me turn to my counsel and ask him to describe it to you real quick.

Mr. VAN NESS. Mr. Chairman, it is our view that the land use planning process does not have to be anything elaborate. It could proceed with the schedule that we have here, but that this committee establishes a goal should it decide to open the coastal plain to development, that there would be no duplication of facilities, that there be a consolidation of activities, that maximum use be made of facilities already in existence at Prudhoe Bay, the DEW Line site, Kaktovik Airport.

So what we are saying is that as the approach, if it is authorized and as the Department approaches it conceptually, keep in mind that the overall land use plan has those goals, avoid duplication, maximize consolidation of facilities.

The CHAIRMAN. So in terms of the legislation, we should just build in goals rather than try to detail how the land use plan is adopted.

Mr. VAN NESS. I think you have to be fairly specific about the goals and make clear that there is a planning responsibility, and perhaps you would require periodic—

The CHAIRMAN. Can you give us some language on that?

Mr. VAN NESS. I certainly can, sir.

The CHAIRMAN. All right.

You speak of hiring Eskimos, and we were at Kaktovik, and I was certainly impressed, I think our whole group was, with their full appreciation of what is involved, their fear on the possible threat to lifestyle, but on the other hand, their desire for the opportunity which this would bring, and I think clearly they ought to be entitled to the opportunity, and there ought to be an effort to maximize the hiring of Eskimos.

How should we respond to that in this legislation? Or should it be just—how should we deal with that?

Do you have language on that?

Mr. LEAVITT. Well, I do not think that there would be specific language, but I think in general that it could be said that the maximum possibility of hiring of the local people would be used in the affected communities.

The CHAIRMAN. Would report language be appropriate for that?

Mr. VAN NESS. I think report language would probably be appropriate. You raise a constitutional question if you get into issues such as local hire. I think the issue is hire people with local knowledge and understanding of the ecology and resources of the area who can give you judgment as to what can and cannot properly be done, and that would be the legislative language.

—

The **Chairman**. Now, as a related matter, you speak of revenue sharing and impact aid.

On impact aid, do we need to build anything into the legislation, or how do we deal with that Kaktovik impact aid?

Mr. **Leavitt**. Well, I think, Mr. Chairman, in any part of the country there has always been an impact aid for affected communities, and I do not think that we are asking for anything different.

In any event, in the time that you have a large scale development, there is going to be certainly some impact into the communities of alcohol and drug abuse and massive large scale developments, and we have come a long ways in our own borough, in our own communities, but I think that we certainly need some help and some guidance.

The **Chairman**. Now, I was persuaded that there has been a huge amount of money wasted up there, I think, was it in Barrow or where, I cannot be more specific than to say that on the North Slope of Alaska there has been huge waste.

How should we seek to avoid that waste if we do provide for impact aid in the future?

Mr. **Leavitt**. Well, I think when you talk about huge waste, I think there certainly has been some of that. The administration that did exist at that time is no longer there. The voters have corrected that. And I do not think that you would ever see that again. There are some safeguards that our local government has put in.

When you talk about huge debt, when you start from ground zero, Mr. Chairman, you do spend a lot of money. Anything that comes up for schools, hospitals, fire protection, the basic needs that everybody wakes up to around here, simply did not exist until the discovery at Prudhoe Bay.

The **Chairman**. Well, I understand that, and I know it is very expensive, but the figures that were given to us on some of the costs and some of the horror stories about some of the contractors in Seattle that just got super rich off of impact aid, we did not have this as formal testimony, but it was enough to persuade me that it was a very serious problem.

The debt is what, a half a million dollars per person or something like that?

Mr. **Leavitt**. Somewhere in that neighborhood, but I think, Mr. Chairman, that that is still under Federal investigation, and I think there are some corrective actions that will be taken.

The **Chairman**. And nothing—we do not need to do anything. You think the voters have responded to that need.

Mr. **Leavitt**. Yes.

The **Chairman**. I mean, I wonder, for example, whether we ought to try to create some Office of Federal Procurement so that to the extent you need to procure something, the Federal Government could offer its services in giving aid in procuring whether it is schools or hospitals.

Mr. **Van Ness**. It raises the recent question about the $500 hammers that the Department of Defense was buying. These are complex areas. As Oliver indicated, this matter is currently before a Federal grand jury. These contractors you have reference to are going to be appearing before that grand jury. We do not know who is at fault or what liability ought to attach. We have read the stories that the things were grossly overpriced. But again, this was not impact aid money. This was all tax revenue that came out of taxing facilities on the North Slope, including local residents and pipeline facilities.

Second, the costs of doing business up there are incredibly high. You look at the cost overruns on the TAPS pipeline which started out to be a $900 million project and wound up costing $10 billion.

The **Chairman**. And should impact aid not be in terms of services or roads or schools as opposed to money?

Mr. **Van Ness**. That is what we are asking for and I think the Borough is asking for.

The **Chairman**. All right.

Next, instead of putting the core calving areas off limits, you state that they ought to have a monitoring and research program.

Your people are the most concerned about the caribou because there is subsistence hunting, and you are satisfied that there should be no off limits of core calving areas, is that correct?

Mr. **Leavitt**. That is correct, but we think that—we do not think that maybe you should lease the entire 1.5 million acres at one time. I think it should be a step process and having this land use planning and this monitoring and research in place can tell you whether it should be leased or not.

The **Chairman**. Can you give us further elucidation on the step process? I do not think that is fully described in the statement, and we would very much like your advice on a step process.

You heard the other witnesses testify today that they thought the whole matter ought to be leased at once, and we would like your view on a step process.

Do you mean there should be sequential leasing or sequential drilling?

Mr. **Leavitt**. I think it should be sequential leasing.

The **Chairman**. So that you do not lease the whole area at one time.

Mr. **Leavitt**. That is right, Mr. Chairman.

The **Chairman**. And what is the reason for that?

Mr. **Leavitt**. It is just bound to make more money for the Federal Government.

But I think to watch this sequential event, you would have this monitoring and this research going on at the time while the others are being drilled, the other areas that are not leased, you would not know whether to lease them or not because I think that you would——

The **Chairman**. Well, as Mr. Herrera pointed out, if you are just drilling in the wintertime, there is nothing really to monitor because the caribou would not be there anyway, and if you want to wait until the development phase to get a baseline, you are talking about many, many years in the future. It seems to me it would stretch the thing out.

Is that not true, or is it?

Mr. **Leavitt**. Yes, I think it is true that you would do that, but I think that we would still believe in that, in stretching it out a bit. I do not think that we can develop the entire area all at one time.

The **Chairman**. Well, we are talking 10 to 15 years before you can get the first oil delivered, and does that mean you would not lease say the core calving areas for 10 years? Are we talking that kind of delay?

Mr. LEAVITT. Mr. Chairman, I think what we mean by this is like for maybe two or three years that you would not lease, for instance, the core calving area if you chose not to.

The CHAIRMAN. What do you learn by delaying two or three years?

Mr. LEAVITT. Because in two or three years you will have found that after you have leased, they would have probably started drilling the exploratory wells, and they will start the process of developing those other fields.

The CHAIRMAN. Well, we would like something in writing on that.

Finally, your suggestion on litigation I think is a good one, and we would welcome any language you have on short circuiting the legal delays because of litigation.

Mr. LEAVITT. Yes, sir.

The CHAIRMAN. Thank you very much.

Senator McClure.

Senator McCLURE. Thank you very much.

Just to get a little better picture, is it true that the native corporation owns 92,000 acres in the same general area?

Mr. LEAVITT. Yes.

Senator McCLURE. And I assume that those acres have been or will be offered for lease.

Mr. LEAVITT. We have offered them for lease. They have been leased.

Senator McCLURE. They are subject to lease now.

Mr. LEAVITT. Yes.

Senator McCLURE. So the phased leasing of ANWR does not have anything to do with the leasability of your lands, or might have some effect upon the development schedule of your lands, is that correct?

Mr. LEAVITT. They could, Mr. Chairman.

Senator McCLURE. You have indicated that you support a policy to open the Coastal Plain area to competitive leasing, and for the exploration and development that would follow.

That is not a unanimous opinion among your people, is it?

Mr. LEAVITT. Not totally. We have certainly some people that think otherwise. But the vast majority——

Senator McCLURE. Is the village in agreement with that statement?

Mr. LEAVITT. They are in a different region. They are Athabascan Indians. We are Inupiat Eskimo.

Senator McCLURE. But are they in support of this policy or opposed?

Mr. LEAVITT. Well, I think, as they have testified throughout the state and to many Members of Congress, they are opposed to this.

Senator McCLURE. Finally, I want to commend your statement, and I also wish to thank you for the hospitality that we got in August when we visited Kaktovik.

I was impressed by two things, and I would like your comment on at least one of those. First, and you do not need to comment. I think throughout the entire visit we had there, I heard no expressed opposition by anyone who lived there.

I think there were three people from New York City who were visiting there who expressed some opposition. But I do not believe there were any locals who expressed any opposition.

The second point that I think is significant is something that came home to me as we met in the relatively modern buildings that the village corporation occupied for the meeting with the village leadership and the citizens of that village. That point is we are not dealing with a situation in which the Eskimo peoples are living now as they lived before.

That has already changed. And in order to support that standard of living, which the Eskimo peoples there now enjoy, even to support it at its current levels, will require the infusion of additional money. Is that not correct?

Mr. LEAVITT. That is very correct, Senator.

Senator MCCLURE. You did live totally on a subsistence economy. You are no longer living totally on a subsistence economy.

Mr. LEAVITT. Totally correct, Senator.

Senator MCCLURE. So, if we are to simply lock the area up and throw the keys away and say to the Eskimo peoples in that area, live like you always did, this would require a substantial change in the other direction.

Mr. LEAVITT. Absolutely true. We would turn, in effect, turn the page back.

Senator MCCLURE. And I think that is very important for us to understand, that we are not dealing with the status quo that existed half a century ago.

Mr. LEAVITT. Just in my lifetime, Senator, there has been a tremendous change. In the past 10 years.

Senator MCCLURE. And I gather from your statement here today, and from the statements we got from the village people when we visited there, that the village people do not want to go back.

Mr. LEAVITT. That is absolutely true. It is hard to give up the televisions, the telephone, and modern housing. We still do not have many things that you people all enjoy down here.

We still have a long ways to go in catching up to the lifestyle that is enjoyed by most Americans.

Senator MCCLURE. The impact of the decisions that we will make will be greater upon you and your people than they will be upon the rest of us.

Mr. LEAVITT. Yes, sir.

Senator MCCLURE. Thank you very much.

Mr. LEAVITT. Thank you.

The CHAIRMAN. Senator Murkowski, and I hate to tell you this, but we have four more witnesses after this.

Senator MURKOWSKI. I will be very brief. For the record, I think, Mr. Leavitt, you indicated that your 92,000 acres was leased.

And you indicated that you did not support leasing the entire 1.5 million acres, but rather a lesser amount than that. And it is quite clear, then, that there is no potential competition. Your acres are already leased and it is done. The question of development scenarios and rated development is a factor. If you do not support putting up the entire 1.5 million, do you support putting up half of it? Or do you have any specific recommendation on that? Because the industries had put it all up.

Mr. **Leavitt**. We do not have a specific recommendation. But I would think that——

Senator **Murkowski**. You said, do not lease it all at once.

Mr. **Leavitt**. Do not lease it all at once.

Senator **Murkowski**. If you have any recommendations, I think it would be appropriate to put them in.

I noted in here in your testimony on page 10, prohibition on export of Coastal Plain crude oil. In view of the fact that we have a provision in the authorization for the pipeline which prohibits the export of crude that goes through the North Slope pipeline from being exported outside the United States, I am curious to know why you would suggest an additional restriction, when the implication is already in there?

And I think it is fair to say that our delegation has taken a position that we are not going to stand by and see restrictions put on Alaska's ability to market our resources in any manner or form.

We have seen the restrictions on North Slope crude, from the standpoint of more or less addressing one specific state, saying, Alaska, you cannot do it, but you can do it from other states.

And it is just generally a policy that we find untenable. And as we look to marketing our gas reserves and others, there is no reason to think that there will not be pressure put on to restrict those exports.

And I am just wondering why you did not feel comfortable enough with the existing prohibition on movement of oil through the pipeline, and why it is in here as an additional restriction, so to speak, because it seems to kind of fly against the tenor of Alaska's attitude toward marketing its exports.

Mr. **Leavitt**. Well, Mr. Chairman, the reason we put this in there is, I think, because it is currently the law now, as it exists, of oil being exported out of Alaska. To save time, you avoid an emotional vote that comes on this debate.

Senator **Murkowski**. Well, I think it is something that, from the standpoint of most Alaskans, we do not feel comfortable with the prohibition, we feel we are singled out, and I think it is fair to say the delegation's position is uniform. We oppose any restrictions on Alaskan resources.

One other question with regard to the caribou. I believe you heard the State of Alaska witnesses yesterday express a concern over the difference of the Porcupine Herd and the predictability of the Western Arctic Herd or the Prudhoe Bay Herd.

And I think there was an acknowledgement that the Central Arctic Herd will move across a road, will go across a pipeline, and there are pictures here submitted for the record of lots of caribou going under the pipeline and about to cross the road.

But there was a statement that the Porcupine Herd perhaps would not cross a pipeline, because while they have crossed the Dempster Highway, there is no pipeline to cross.

I am curious to know, as a consequence of your observing this process of where we go with the caribou calving area, your recommendation is quite clear. But is there a difference in these caribou, from the standpoint of your people's observation of them?

I have heard you say that they taste the same. But beyond that.

Mr. **Leavitt**. I do not know. Maybe they have got blue eyes. No, Mr. Chairman. I do not think there is any difference in the caribou.

No matter what part of the country they are from, they are all in the Arctic. I mean, as an experience, for instance, we have a village in Anatuvik Pass where the caribou herd goes through every year, just masses of them go through.

And there is a village that exists in this pass, there is no other place except the sides of the mountains. And they go right through the village. And they go right alongside of it. And it has been existing for years.

That village was established there in 1949, only because the mail route was running through there. But the caribou, once in a great while, like in 10, 12, 15 years, sometimes does not go through there, and they go through another pass.

And then somebody suggests, there is something wrong. And the next year they go right back again. So there is no explanation to any of this. And caribou does not care which way they go. When they decide to go, they go.

Senator **Murkowski**. Is there any need for special provisions in the ANWR leasing bill to permit development and production of the KIC and ASRC private lands on the Coastal Plain? Or is that all taken care of by existing regulation?

Mr. **Van Ness**. Mr. Chairman, let me clarify. Assuming that ANWR Coastal Plain is open to development, then ASRC can develop its private lands.

What is not clear is its access to right-of-way authority. I think that is ambiguous also, generally with respect to the Coastal Plain, in terms of which right-of-way authority is applicable.

Is it a Title XI? Is it the existing authority in the mineral leasing act of the public lands statutes? If it needs to be looked at, we will take a look at it and submit a memorandum for you.

Senator **Murkowski**. It is quite clear that your leased land, your 92,000 acres, without the authorization to open ANWR, you would have no access to market for your product, if it were there.

Finally, with regard to your recommendation for a land use planning process, you perhaps envision that the borough, the North Slope Borough and Kaktovik, perhaps, would be formally official participants in the process?

Or is it a very informal relationship that you have in mind?

Mr. **Leavitt**. I think that when the government gets started on issuing leases, and issuing EIS's, they are going to be part of it anyway.

But we would like them to be recognized as the formal——

Senator **Murkowski**. Does that imply right of veto?

Mr. **Leavitt**. Oh, no, no.

Senator **Murkowski**. So it is formal but informal?

Mr. **Leavitt**. Rather informal. Be consulted with.

Senator **Murkowski**. Thank you, gentlemen.

The **Chairman**. Thank you very much. Mr. Leavitt and Mr. Van Ness, we appreciate your being before the Committee and we look forward to getting your additional language, as requested.

Finally, we have a panel composed of Derrick Crandall, President of the American Recreation Coalition, Leroy Watson, Legislative Representative of the National Grange, Dale P. Jones, Senior Vice President of Halliburton Company, and Alvin H. Fleetwood of the Alaska State Chamber of Commerce.

Gentlemen, welcome to the Committee. All of you have excellent statements, which will be put into the record. We have read these statements and each of you might in turn give a summary or an emphasis of any matter that is not in your statement.

I am sorry that I am going to have to go to another appointment. But your statements are very excellent, and Senator McClure will preside. Thank you very much for appearing. I guess, number one, Mr. Crandall would lead off.

STATEMENT OF DERRICK CRANDALL, PRESIDENT, AMERICAN RECREATION COALITION

Mr. CRANDALL. Thank you, Mr. Chairman. Let me summarize my statement and very briefly explain our interest in the Arctic National Wildlife Refuge.

There are a number of essential elements for recreation, if you will, common denominators for all Americans who enjoy the outdoors. These includes clean air, clean water, and high quality fisheries, scenic areas, and energy.

But regardless of our choice of outdoor activity, we require energy to access the areas for our recreational use and for many of the recreational activities themselves.

Over the past 15 years, the recreation community has found itself victimized by government decisions in the energy arena.

As the Chairman knows well, proposals to ban weekend boating, proposals to impose excise taxes on specific recreation equipment, state proposals to ban RVs from the highways, and a variety of other end-use allocations of gasoline and other oil products have had terrible impacts on the recreation community.

As the Arctic National Wildlife Refuge issue first came to our attention two years ago, we saw every prospect for this to be a lose-lose situation. By that I mean that the environmental risks of development were seen by many in the recreation community as being extremely dire.

And second, we saw great prospects for lifestyle and economic risk if development were not decided upon because of the steadily rising consumption of imported oil and the risk that that places this Nation and our economy.

That prospect for a lose-lose situation motivated approximately 20 recreation and community leaders to take the time to travel to Alaska to see Prudhoe Bay and the Arctic National Wildlife Refuge.

Those who went represented a broad spectrum of the recreation community, drawn from the boat industry, from the ski industry, outfitters and guides, representatives of individual membership organizations such as the Good Sam Club and others, companies such as Disney and KOA.

As we delved into the issue, and looked into the facts, we found the issue was clarified for us. In fact, we believe that the situation is amenable to a win-win solution.

Acting now, we believe that development of the Arctic National Wildlife Refuge can ensure sound environmental decisions, which will produce the domestically produced oil this Nation so desperately needs.

It will also provide us with the knowledge to shape a sound domestic energy plan into the 21st century, because it will provide us with more information about what we have as domestic energy reserves.

And finally, let me say that the recreation community is very interested in the proposal that Senator Johnston has introduced to reinvest a portion of the receipts generated from sales of oil and gas in the Arctic National Wildlife Refuge to provide a permanent legacy to the American people, modeled after, in fact, the very successful land and water conservation fund which derives a portion of its funds from sales of leases and from the royalties derived on oil and gas from the outer continental shelf.

Senator Johnston and I had the privilege of serving on a recent Presidential commission looking at Americans outdoors that identified major urban and other recreational needs of the Nation.

We believe that the opportunities represented by the revenues associated with the Arctic National Wildlife Refuge could become an important part of satisfying those needs. Thank you for the opportunity to express our feelings, and appreciate the interest of the Committee.

[The prepared statement of Mr. Crandall follows:]

STATEMENT BY DERRICK CRANDALL, PRESIDENT, AMERICAN RECREATION COALITION, BEFORE THE UNITED STATES SENATE ENERGY AND NATURAL RESOURCES COMMITTEE, REGARDING S.1217, "THE ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987," OCTOBER 14, 1987.

Mr. Chairman and Members of the Subcommittee on Public Lands, I am pleased to be here today to offer a statement regarding leasing of the Coastal Plain of the Arctic National Wildlife Refuge for oil and gas exploration. My name is Derrick Crandall, and I serve as President of the American Recreation Coalition (ARC). ARC is a federation of nearly 100 corporations, associations and organizations comprising a major portion of our nation's outdoor recreation community. Our members include active groups of outdoor enthusiasts, such as the American Youth Hostels and the Family Motor Coach Association, trade associations representing thousands of manufacturers, such as the National Marine Manufacturers Association and the Recreation Vehicle Industry Association, equipment manufacturers like The Coleman Company and Huffy Corporation, and recreation service providers such as Kampgrounds of America and Walt Disney World.

All ARC members share a common concern about the future of America's energy supplies. Energy was the central issue which brought about formation of the Coalition in 1979. Recreation was a major victim during the '73-'74 and '79-'80 energy crises, when certain government officials displayed a hostile attitude toward the consumption of energy for leisure and recreational pursuits. Allocation and rationing plans made travel in cars and recreation vehicles very risky; one could not predict that sufficient gasoline could be found at one's destination to complete the return trip home. A proposed ban on weekend motorboating had disastrous effects on the marine industry, and significant problems were experienced in the recreation vehicle, campground, skiing and resort industries. Recreation is a $300 billion per year industry in America, including thousands of small "mom and pop" businesses. Recreation should not be singled out in the face of energy shortages.

The availability of adequate liquid fuels at a reasonable cost is vital to all travel and to nearly all forms of outdoor recreation. The American Recreation Coalition has adopted a comprehensive energy policy which addresses the needs of the recreation community. The major elements of this policy are:

- opposition to any government policies or actions which impose discriminatory energy restrictions on specific recreational activities;

- support for voluntary conservation efforts;

- support for the development of a mix of dependable energy resources at reasonable prices; and

- support for programs to encourage conversion of stationary uses of liquid fuels to other energy sources in light of the special importance of liquid fuels in moving people and goods.

We are reminded of the harsh realities of a dependence upon imported oil by news reports from the Persian Gulf every day. America is likely to experience another energy shortage in the future as a consequence of our reliance on these imports, but we can -- and must -- take positive precautions to protect this country from a severe energy shock.

We must work hard to increase our energy independence through increased domestic production. Oil imports have increased 23% since 1986, with some experts forecasting as much as a 50% dependency upon imported oil by 1990. Currently, oil imports are running about 44% of the nation's total consumption, and are rapidly approaching the 48% all-time high reached in 1977. These trends and projections are very disturbing. Congress should not delay -- or wait for a major crisis -- before making decisions which will secure America's energy future. Our best energy reserves lie under the ocean floor and under the frozen tundra of Alaska, areas which take ten to fifteen years to bring into production.

The American Recreation Coalition has been actively involved in educating the recreation community about America's energy resources, sponsoring energy seminars and trips to an offshore platform in California and to the North Slope of Alaska. Two groups of ARC representatives have toured the Prudhoe Bay production facilities and many saw firsthand the area now under consideration in the Arctic National Wildlife Refuge. We have engaged in frequent discussions with a variety of experts over the future of our domestic energy program and ways to decrease our reliance on volatile foreign imports.

The 1.5 million acre Coastal Plain of the 19 million acre Arctic National Wildlife Refuge represents the best potential domestic on-shore source of oil in all of North America. Interior has estimated that reserves ranging from 4.8 to 29.4 billion barrels of crude oil could be present in ANWR. Despite the size of the potential find, it is estimated that the actual footprint of ANWR development would be only one tenth of one percent of the Coastal Plain.

North Slope oil is already playing a major role in supplying America's energy needs. Prudhoe Bay oil fields are pumping 1.5 million barrels of oil per day -- 20% of our domestic energy production -- down the Trans-Alaska Pipeline (TAPS) to Valdez. When Prudhoe Bay's production begins its steady decline in 1988, we should be working to replace it with ANWR oil. In light of the vast infrastructure already in place, and the billions of dollars invested in TAPS, this makes a lot of sense.

Members of the American Recreation Coalition have a very high level of concern over the possible environmental impact of oil exploration and production in the Arctic National Wildlife Refuge. But our concerns were allayed by our visits to Prudhoe Bay. We were reassured by the high level of environmental responsibility shown by the oil companies, by the research they have sponsored and the technology they have developed. The solutions they have found to effectively deal with the harsh climate and to prevent harm to the wildlife and the Arctic tundra were extraordinary.

Facts show that the caribou herds indigenous to the area have steadily increased in size since the presence of oil drilling and treatment facilities. Many species of birds and animals continue to spend the summer months in the area with no apparent impact on populations. During our visit to Prudhoe in early June, we saw a surprising array of wildlife wandering among the facilities. Caribou were feeding alongside a collection center; tundra swans were floating on the ponds formed by the melting ice; and scores of birds including ducks and geese were flying about, nesting and feeding on the lakes between buildings. Constant monitoring of the wildlife, extensive and costly mitigation efforts, and the implementation of new production technologies, indicate the oil industry is sincere in its commitment to minimizing environmental impacts.

Today, most of the Arctic National Wildlife Refuge -- 17.5 million acres -- is protected by Wilderness status. These areas do not contain the oil reserves our country needs to maintain a strong domestic energy program, and we can see the wisdom of protecting the qualities of the mountain wilderness of the Brooks Range south of the Coastal Plain.

However, the 1.5 million acres of the 1002 area, unique for its potential to contribute so greatly to this nation's energy security, should not be locked away as Wilderness. The petroleum industry has demonstrated a willingness to protect the environment, and exploration undertaken now -- in the absence of an immediate crisis -- add to our confidence that only careful exploration will take place. We support the passage of S.1217, the bill under consideration today.

We are also supportive of legislation introduced by Senator Johnston which would insure that some of the federal receipts derived from ANWR leasing would enhance our natural resources. We have seen the great contribution revenues from Outer Continental Shelf leasing have made to conservation of our natural resources through the Land and Water Conservation Fund. A similar program in ANWR could continue the important job of protecting sensitive lands.

We believe a portion of the royalties on oil and gas from ANWR should be dedicated to building a permanent legacy for future generations of Americans through the purchase of key natural areas, such as wetlands in the lower forty-eight states, that are threatened by development or other factors, and encourage this Committee to pursue this course.

Mr. Chairman, several ARC members have written to register their support for this legislation under consideration today. We would like to have these letters of support entered into the record along with our testimony.

To conclude, few are more concerned about or more dependent upon the quality of the lands and wildlife than the recreation community. We are committed to the protection and enhancement of America's natural resources. In the case of the Coastal Plain of the Arctic National Wildlife Refuge, we believe that the environment need not be and will not be sacrificed if oil and gas exploration and development are permitted on a careful basis.

Derrick A. Crandall, President
American Recreation Coalition
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Washington, D.C. 20004
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FLEETWOOD ENTERPRISES, INC.
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ELDEN L. SMITH
Senior Vice President
Recreational Vehicle Group

October 8, 1987

The Honorable J. Bennett Johnston
Chairman, Energy and
Natural Resources Committee
United States Senate
Washington, D.C. 20510

Dear Mr. Johnston:

We wish to indicate our full support for the testimony of the American Recreation Coalition regarding the opening of the Arctic National Wildlife Refuge to exploration and development of its energy resources.

We are the world's largest manufacturer of recreational vehicles and manufactured housing. We employ in excess of 11,000 people in 46 facilities throughout the United States. Our employees' livelihood and the future success of our business depends on an adequate supply of gasoline being available. We feel strongly that the energy supplies of the Arctic National Wildlife Refuge must be explored and that any resources found can be recovered without damage to the environment.

We urge the Energy and Natural Resources Committee to support the opening of the Coastal Plain of the Arctic National Wildlife Refuge to exploration and development of any oil and gas resources found.

Sincerely,

Elden L. Smith

Elden L. Smith

YAMAHA MOTOR CORPORATION, U.S.A.
6555 KATELLA AVENUE
CYPRESS, CALIFORNIA 90630

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(714) 761-7300

October 13, 1987

The Honorable Bennet Johnston
Chairman
Energy & Natural Resources Committee
United States Senate
Washington. D.C. 20510

Senator Johnston:

I wish to strongly recommend that Congress open the entire 1.5 million acres of the A.N.W.R. Coastal Plain to oil and gas exploration and development.

I have been an executive in marketing in the oil business (retail marketing) and in the recreation business for more than 30 years. I was stationed in Alaska during my military service and do appreciate the beauty and potential of the state. We are in the Snowmobile business, and I made trips to Alaska during the pipeline construction. I was impressed by the general attitude and concern for the environment expressed by builders and workers. My information indicates that caribou and other wildlife have not been disturbed by the pipeline but have found it somewhat beneficial.

I want to speak for the thousands of retail dealers who dispense petroleum products to the consumers and for the thousands of recreational dealers. These dealers serve millions of consumers. There is a tendency to think "big oil" and "big business", and they make a popular target. Make sure the focus on this issue has some depth, and remember the impact on small businessmen and consumers.

We continue to rely more and more on oil imports. Our trading partners are vulnerable because of the continuing chaos in the Gulf. Logic and wisdom should prevail in this matter. I encourage positive action to take advantage of this important resource for the benefit and protection of this country. We simply can't afford to stick our heads in the oil sands. It is best if we drill and produce for the future of this country.

Sincerely,

MERGE J. KARST
Sr. V.P./Director
Sales & Marketing

Mammoth/June
SKI RESORT

September 4, 1987

MEMORANDUM

TO: Donald Paul Hodel, Secretary of the Interior

FROM: David McCoy

RE: Arctic National Wildlife Refuge Legislation

When we were invited by the American Recreation Coalition to visit a project of the size and magnitude of the Alaskan oil development we expected that everything we would see would be on an enormously large scale with huge drilling rigs and black oil intruding into the Alaskan wilderness. We also expected to see a lot of temporary housing and transient employees working under severely cold and inhospitable conditions.

But arriving at the airport we were warmly greeted by several representatives who turned out to be long-term employees of the oil companies. Our bus driver, another long-time employee, was not only our chauffeur, but also a friendly host and tour guide, extremely knowledgeable of the area and wildlife.

When we arrived at the headquarters we encountered another pleasant surprise. In the middle of the sparse Alaskan landscape was a warm, tropical facility with many amenities such as a greeting center and recreational and entertainment areas. We were made to feel very warm and comfortable and never had the feeling of being out in the middle of the wilderness as we were.

On our tour of the drilling and processing areas, we never saw anything massive or out-of-place in the area. Everything was spotlessly clean and unrecognizable as being part of a traditional oil field. We saw caribou on the tundra, unbothered by anything and birds of all species native to the area along side the road. The pipeline delivering oil provided a protective shade for the animals!

We were impressed with the large amount of long-term employees and the pride they took in their work. The engineers, managers and everyone we met seemed to be in harmony with what they were doing. Every question posed before construction was ever begun had been addressed and the problems solved in the planning

Continued

stage. For such an enormous undertaking, all the facilities were laid out in a well thought-out, organized manner and were free from any clutter.

Laymen like ourselves could walk through each station and be familiar with the purpose of each piece of machinery from the carefully labeled parts. Everything was cleaner, neater and more efficient than a city office. We never saw a drop of oil or puddle of mud.

We learned so much from seeing the efficiency of their entire operation, including receiving areas and generating plants, that it inspired us to see how we can make improvements on our own operations. It was an infectious experience. As a whole, I was so impressed with the care and planning that went into this exquisite facility and its lack of impact on the environment, that I plan to go back to visit Valdez and see how the rest of the operation works.

We also learned a lot about the oil usage and how much goes to the lower 48 states. Without it we would be even more dependent on the Middle East which is not what we really need or want. It gave us a certain confidence to know that we have this resource in our own "back yard."

As a result of my visit to Prudhoe Bay, I have a whole new appreciation of the value of energy and now realize that in the United States, Alaska has the greatest reserve of energy in the form of oil. If we do not want to depend on outside sources, then we need to allow exploration now in the Arctic National Wildlife Refuge.

I would like to have the confidence to know that the possible abundant oil deposits in the ANWR could be brought on line as the Prudhoe Bay fields are being depleted. The continued flow would utilize the existing transportation and associated facilities and would guarantee our country an energy source of our own while alternative resources are being explored and developed.

Since you have visited Prudhoe Bay yourself, I am sure you will agree that if every Representative and Congressman had the opportunity to see this facility they would come up with the same conclusion as I did.

Dave McCoy

DM/pr
cc: Derrick Crandall
American Recreation Coalition

HARRIS PUBLISHING, INC.
Publishers of Snowmobile West, Potato Grower of Idaho, The Sugar Producer

October 12, 1987

The Honorable J. Bennett Johnston
Chairman, Energy and Natural Resources Committee
United States Senate
Washington D.C. 20510

Dear Senator:

I write in favor of oil and gas exploration and development within the coastal plain of the Arctic National Wildlife Refuge.

As a snowmobiler, trailbiker, ATVer, boater, highway motorcycle tourer, and magazine publisher who represents those recreational interests throughout the western United States, I would hope that our government would pursue a policy that would develop energy resources within our borders and place us less dependent on foreign oil.

I fully understand that ANWR currently is protected by wilderness status. However, our country has recently tipped the scales too far on the "environmental protectionist" side at the expense of motorized recreation and the development of vital natural resources. We hope that ANWR can be developed consistent with reasonable protection measures.

The people we represent in the snowmobile and summer motorized recreation industry fully support the stand taken by the American Recreation Coalition in respect to ANWR.

Sincerely,

Darryl W. Harris

enclosures: copy of Snowmobile West, copy of BlueRibbon

cc:Derrick A. Crandall, American Recreation Coalition

520 Park Ave., P.O. Box 981 • Idaho Falls, Idaho 83402 • (208) 524-7000

TL ENTERPRISES, INC.

29901 Agoura Road
Agoura, California 91301
(818) 991-4980

October 16, 1987

The Honorable J. Bennett Johnston
Chairman, Energy and Natural Resources Committee
U.S. Senate
Washington, D.C. 20510

Dear Senator Johnston:

Having had the opportunity to visit Prudhoe Bay, I would like to express my support for oil exploration in the Arctic National Wildlife Refuge, and to have my comments included in the record of the committee's hearings.

I believe the Interior Department's exploration proposal is responsible and reasonable, in view of this nation's obvious critical need for development of petroleum resources. A majority of our 500,000 readers appear to agree, based on response to a column I wrote on the topic following my Prudhoe trip.

I have followed reports and commentary in the general press on this issue, and find that opponents have attempted to represent the ANWR situation as an environmental issue. It was obvious during my Prudhoe visit about a year ago that the oil companies have done a fine job of minimizing the effect of their work on wildlife and the land, and they have done it at huge expense. Environmentalists' attempts to paint oil exploration in ANWR as a potential disaster do not make sense when the oil companies' record at Prudhoe Bay is examined. Unfortunately, the average citizen does not have the opportunity to properly examine this record. Opponents of ANWR continue to cry wolf in the general press with their factually unsupportable concerns, suggesting we must choose between wildlife and oil.

We can anticipate that the oil companies will conduct their operations properly in ANWR, assuming they have proper governmental supervision, and that the environmental impact inside the comparatively small oil development area will be negligible.

Assuming a major oil discovery is made and that a field the size of Prudhoe were to be developed, I believe the small environmental price is rather insignificant compared to the potential benefits to our country's energy future.

Sincerely,

Bill Estes

Bill Estes
Associate Publisher

BEds

cc: Derrick Crandall, President
American Recreation Coalition

National Campers and Hikers Association Inc.

"The Friendliest People in the World"

October 9, 1987

Honorable J. Bennett Johnston
Chairman, Energy and Natural Resources Committee
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

The National Campers & Hikers Association (NCHA) is the world's largest member-owned camping organization. Our membership is quite concerned about America's energy resources. NCHA suffered greatly during the 1973-74 and 1979-80 energy crisis. In fact, we were forced to cancel our 1974 annual campvention due to the shortage of gasoline and its high cost when it was available.

The availability of gasoline and diesel fuel at reasonable cost is essential to our membership for continued outdoor recreation. Congress should not delay making decisions which will secure America's energy future.

The 1.5 million acre coastal plain area of the 19 million acre Artic National Wildlife Refuge represents the best potential to develop an on-shore source of oil of all of North America. The Prudhoe Bay oil field pumps 1.5 million barrels of oil daily through the trans-Alaska pipeline to Valdez. But, Prudhoe Bay's production will steadily decline after 1987. Oil from the coastal plain could replace the loss at Prudhoe Bay and the pipeline is already in place to get the oil to market.

Members of NCHA have a high level of concern over the possible environmental impact of oil exploration and production in the ANWR region. I was fortunate to have the opportunity to see Prudhoe Bay last June, and was overwhelmed by the level of concern shown by the oil companies regarding the environment. I saw caribou feeding next to a collection center, numerous waterfowl floating on ponds formed by the melting ice, and scores of birds flying about. I feel the oil industry is sincere in its commitment to minimize environmental impact.

NON-PROFIT EDUCATIONAL FAMILY CAMPING ORGANIZATION
LOVE THY NEIGHBOR — LOVE THY GOD

Congress can act now by allowing exploration and development of the 1002 leasing area in ANWR. With the projected 10-year completion date for production; a far less initial impact would occur to the area then if it were delayed to where it had to be developed on short notice.

I request that this letter be included in the official record for these hearings.

Sincerely,

Edwin E. Kibler

Edwin E. Kibler
NCHA Legislative Director, USA
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COMMENTARY

In Support of Alaskan Oil Development

We should begin development now when we can best balance environmental and energy concerns.

Early this month, I had the opportunity to join a group of RV industry leaders on a trip to Alaska's North Slope. The occasion was a tour, arranged by the American Recreation Coalition (ARC), of the controversial oil fields at and around Prudhoe Bay.

Specifically, the objective of the trip was to gather information about the Arctic National Wildlife Refuge (ANWR). The entire area consists of some 19 million acres, although only 1.5 million acres at the northernmost point are being sought for development.

Prior to my trip, the conflicting elements of this debate seemed clear: the need to develop more energy versus the concern for the environment. What I discovered after seeing the area firsthand, however, is that there really should be no controversy at all. The case for developing this small portion of ANWR is overwhelmingly supportive.

From a pure energy standpoint, it's no secret that our present energy supplies are dwindling rapidly. About a year ago, the United States was importing 31% of its oil. Recent months have seen an increase to more than 40%; and the American Petroleum Institute predicts that this figure could climb to more than 50% by 1990.

As far as the environment is concerned, the issue is much more simple than those opposed to ANWR would have us believe. While the oil companies have made their share of mistakes in the past, the successes reached in other North Slope areas clearly show that they are not insensitive behemoths running rampant in a pristine, idyllic countryside.

On the contrary, the coastal plain of ANWR represents some of the most barren land imaginable. For as far as the eye can see (which is, admittedly, not far because fog blankets the area much of the time), tundra and ice make the area almost uninhabitable.

Yet despite the isolated nature of the land, the care that's been taken in nearby Prudhoe Bay is testimony to the fact that big oil and the natural land can co-exist.

The entire pipeline project itself was built during the dead of winter in temperatures well below zero and when the ground was frozen solid in order to practically negate any effects on the environment. The pipelines were also built five to seven feet above the ground to allow the caribou to cross underneath and to ensure that the heat of the oil did not disrupt the delicate nature of the permafrost.

As a further example of the sensitivity that can be and has been exhibited in the area, much of the equipment used is almost mind-boggling in its lack of effect on the area. Large trucks that must travel across the native tundra are outfitted with huge balloon tires. These tires distribute thousands of pounds so delicately that a person could lie underneath the vehicles and walk away unharmed.

So if energy and environmental concerns aren't the problem, what's the issue? Old-fashioned politics is the answer.

The primary reason we're debating the problem in Congress is simply that a few special-interest environmental groups have rallied around ANWR to create a conflict, gather publicity and put themselves in the limelight to attract attention and, not too coincidentally, more members.

If these groups were truly concerned about the environment, they would see the need to proceed now in an orderly fashion with the exploration of this potentially huge oil reserve.

We're in a period of relative energy stability. However, if we drilled immediately in ANWR, it would take until approximately the year 2000 before consumers were able to use that oil. Yet postponing of that decision until an oil crisis is upon us guarantees there will be fewer restraints that now maintain environmental sensitivity.

The solution is clearly to begin development now—at a time when we can best balance the environmental concerns with the need to supply energy. Following that approach will ensure that both sides get what they want. Δ—*Michael Schneider*

Senator McCLURE [presiding]. Thank you very much.

Mr. Watson?

STATEMENT OF LEROY WATSON, LEGISLATIVE REPRESENTATIVE, THE NATIONAL GRANGE

Mr. WATSON. Thank you, Senator. And on behalf of the 365,000 Grange members across the country, I would like to thank you and the Committee for the opportunity to present our views in support of S. 1217.

As others far more qualified than I will tell you, the Coastal Plain of ANWR is considered to be the best remaining prospect to find large amounts of oil on land in the United States.

Now, our support S. 1217 can be summarized by two major points. First is the fact that rural Americans in general understand both the benefits and risks inherent in the exploration and development of oil.

For decades most of the exploration and production of this Nation's oil and natural gas has occurred in rural America. This Nation's small towns and rural communities have benefited from jobs and economic activities associated with oil and gas development.

But those same towns and communities have also borne a disproportionate share of the environmental risks associated with oil and gas development.

To better manage the risks and the benefits of oil and gas development, the Grange supported and often sponsored land owners associations and regulatory efforts, have negotiated with petroleum development and exploration companies for many years.

These rural landowners ask tough questions of the people who want to come onto their property and drill holes in it. As such, educational efforts on both sides and innovative technical solutions were often needed to allow oil and gas drilling to occur in areas of this country as environmentally sensitive as anything on the ANWR Coastal Plain.

Few family farmers are willing to gamble with the long-term agricultural productivity of their private property with the relatively short-term profits from oil and gas development until they are convinced that the risks will be kept to the barest minimum.

This has given our membership across the country the personal experience and informal technical background to judge the claims that the ANWR Coastal Plain can be explored in an environmentally sound manner.

As residents of rural America, our Grange members feel confident that ANWR can be developed in an environmentally sound manner.

Our second major point is that for farmers and other residents of rural America, domestic energy security and the cost of energy are important concerns.

In passing the Food Security Act of 1985, Congress sent a clear message to the American farmer that lower commodity loan levels and gradual decreases in commodity target prices over the life of the Act means that American farmers must adjust their operations to efficiently derive more of their income from market sources.

The Grange believes that implicit in that message is a commitment by Congress to our family farmers that if their farm products must be priced and sold in a competitive free market, then the inputs they use to produce those products must also be priced in a competitive free market.

Now, petroleum and natural gas prices, both directly and indirectly, are among the largest components of the costs of production in our Nation's family farms.

Using data provided by the USDA, our staff has calculated that a $10 a barrel increase in the cost of oil above today's levels would place family farmers in a severe cost price freeze.

On sample 300-acre farms, which are not really large by today's standards, $10 a barrel increase in oil prices would raise the average yearly costs of production in a range from $660 to $3,000 a year, depending on whether the farm primarily produced soybeans, wheat, corn, cotton, or rice.

In our opinion, artificial contrivances that discourage the exploration for and the production of U.S. domestic petroleum resources will only distort future and current petroleum product prices upward, and will break the implicit commitment made to this Nation's family farmers in the Food Security Act.

The fate of rural America, we believe, is entwined with the fate of this Nation's natural resources, such as oil. The National Grange believes that S. 1217 follows a progressive policy that allows a reasonable development of our domestic oil and natural gas resources in an environmentally sound manner.

We understand the concern by some that oil and natural gas development on the ANWR Coastal Plain will damage fragile Arctic ecosystems or degrade local economic resources.

However, after examining the available data on all sides of the issue, we believe that developing the ANWR Coastal Plain will benefit our national energy security, our jobs, our farms, and our environment. Thank you very much.

[The prepared statement of Mr. Watson follows:]

STATEMENT BY THE NATIONAL GRANGE

BEFORE THE

U. S. SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

OCTOBER 14, 1987

RE: OPENING PORTIONS OF THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE RESERVE TO OIL AND GAS EXPLORATION

Mr. Chairman, my name is Leroy Watson. I am a Legislative Representative for the National Grange, this nation's first general farm and rural affairs organization. I work out of our national headquarters in Washington, D.C. at 1616 "H" St., N.W. and on behalf of the 365,000 Grange members across the country, I would like to thank you and your Committee for the opportunity to present our views in support of our position to open the Coastal Plain of the Arctic National Wildlife Reserve (ANWR) to oil and gas exploration in an environmentally sound manner.

The Coastal Plain area of ANWR, which is located near the famous Prudhoe Bay oil fields of northern Alaska, is considered to be the best remaining prospect to find large amounts of oil on land in the United States. Valuable experience obtained during the exploration and development of the Prudhoe Bay fields has given the U.S. oil industry the technical know how to find and extract petroleum resources in the sensitive environmental north of the Arctic Circle without resulting in irreversible ecological damage. Furthermore, the existence of the nearby TransAlaska oil pipeline makes the transportation of oil from the ANWR Coastal Plain both economically feasible and environmentally more benign.

Rural Americans, in general, understand both the benefits and risks inherent in the exploration and development of oil. For decades, most of the exploration and production of this nation's oil and natural gas has occurred in rural America. This nation's small towns and rural communities have benefitted from jobs and economic activities associated with oil and gas development, but those same towns and communities have also borne a disproportionate share of the environmental risks associated with oil and gas development.

To better manage and weigh the risks and benefits of oil and gas development, Grange-supported, and often sponsored, landowners' associations have negotiated with petroleum development and exploration companies for years. These rural landowners ask tough questions of the people who want to come on to their property to drill holes in it. As such, educational efforts on both sides and innovative technical solutions were often needed to allow oil and gas drilling to occur in areas of this country as environmentally sensitive as anything on the ANWR Coastal Plain. Few family farmers are willing to unknowingly and recklessly gamble with the long-term agricultural productivity of their private property for the relatively short-term profits from oil and gas development until they are convinced that the risks will be kept to acceptable levels and the barest minimum.

The process of oil and gas development in their communities, often in unique environmental circumstances on valuable private property, has given our members all across the country the personal experience and informal technical background to judge the oil industry's claim that the ANWR Coastal Plain can be explored and developed. As residents of rural America, Grange members feel confident that the ANWR Coastal Plain can be developed in an environmentally sound manner.

For farmers and other residents of rural America, domestic energy security and the cost of energy are also important concerns. In passing the Food Security Act of 1985, Congress sent a clear message to American family farmers that lower commodity loan levels and gradual decreases in commodity target prices over the life of the Act means that American farmers must adjust their operations to efficiently derive more of their income from market sources. The Grange believes that implicit in that message is a commitment by Congress to our family farmers that if their farm products must be priced and sold in a competitive, free market, then the inputs they use to produce those products must also be priced by a competitive free market.

Petroleum and natural gas prices, both directly and indirectly, are among the largest components of the costs of production on our nation's family farms. Using data provided by the U.S.D.A., our staff calculated that a $10 a barrel increase in the cost of oil above today's levels would place family farmers in a severe cost/price freeze. On sample 300 acre farms (not really large by most of today's standards), a $10 a barrel increase in oil prices would raise the average yearly costs of production as follows:

Soybeans - $ 660
Wheat - $ 690

Corn	- $1,080
Cotton	- $2,160
Rice	- $3,000

Politically artificial contrivances that discourage the exploration for and production of U.S. domestic petroleum resources, such as a moratorium on oil and gas exploration on the ANWR Coastal Plain, will only distort future and current petroleum product prices upward even further and will break the implicit commitment made to this nation's family farmers in the Food Security Act.

The fate of rural America is intertwined with the fate of this nation's natural resources, such as oil. The National Grange believes that this nation's energy policy should allow the reasonable development of our domestic oil and natural gas resources in an environmentally sound manner. We understand the concern by some that oil and natural gas development on the ANWR Coastal Plain will damage fragile arctic ecosystems or degrade local economic resources, such as hunting areas for Alaskan native hunters. After examining the available data on all sides of the issue and drawing on the collective experience of Grange members across the country, we believe that developing the ANWR Coastal Plain will benefit our national energy security, our jobs, our farms and our environment.

Thank you, Mr. Chairman, for giving the National Grange this opportunity to express our views.

Senator McClure. Thank you.

Mr. Jones, you are next.

STATEMENT OF DALE P. JONES, SENIOR VICE PRESIDENT, HALLIBURTON CO.

Mr. Jones. Senator, I am Senior Vice President of Halliburton Company, one of the world's largest oil field service, engineering and construction companies. I am also here today representing the Petroleum Equipment Suppliers Association, PESA, which is an association representing U.S. manufacturers and suppliers of oil and gas services. We have about 250,000 employees in 46 states and over 50 foreign countries.

I will be very brief in my remarks today. Halliburton Company and PESA support the enactment of Senate Bill 1217. In addition to providing for the development of potentially vast oil and gas resources to meet U.S. energy needs, this bill is important to the extremely depressed oil field services industry for additional reasons. During two years of severely depressed economic conditions in the petroleum industry, several hundred thousand workers have lost their jobs, and many, many oil field service companies have gone bankrupt.

U.S. oil service companies are clearly the technology leaders in the worldwide industry. However, spending for technology development has been reduced by hundreds of millions of dollars in recent years. As you know, even though there has been some improvement in the drilling activity in recent months, it continues at a level much less than required to maintain United States production. We have found that in rehiring personnel to handle the very small activity increase, thousands have left our industry permanently, and there is a shortage of knowledgeable, trained personnel in some areas today.

Opening the ANWR Coastal Plain for oil operations will be an important step forward in rejuvenating the industry and the hundreds of supply and service companies I represent. It would contribute toward our ability to maintain an industry capable of meeting the critical service needs of the petroleum industry in the United States.

It is important to the petroleum industry and the United States as a whole that we be financially fit enough to maintain reasonable research and development programs.

In summary, this legislation will assist in the maintenance of a viable service industry which can continue to develop the leading edge of technology in our industry.

Thank you.

[The prepared statement of Mr. Jones follows:]

Statement of

DALE P. JONES
SENIOR VICE PRESIDENT
HALLIBURTON COMPANY

on behalf of

HALLIBURTON COMPANY,

and the

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

before the

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

October 14, 1987

Mr. Chairman, my name is Dale P. Jones and I am representing Halliburton Company, one of the world's largest oil field service, engineering and construction companies. I am also speaking on behalf of the Petroleum Equipment Suppliers Association (PESA).

PESA is a trade association representing 90 percent of U.S. manufacturers and suppliers of oil and natural gas equipment and services. The U.S. petroleum equipment and service industry has about 250,000 employees in 46 states and more than 50 foreign countries.

Halliburton Company and PESA support the U.S. Department of the Interior's recommendation that the Arctic National Wildlife Refuge (ANWR) coastal plain be opened to oil and natural gas leasing. We urge the Congress to enact the legislation (S. 1217 and H.R. 1082) which has been introduced to permit such leasing. We believe development of the potentially vast petroleum resources of the ANWR coastal plain is vital to meeting future U.S. energy and economic needs. We also believe that such development is particularly important in this time of depressed economic conditions in the oil-producing states which have so directly affected the supply and service companies we represent.

The nation's best hopes for major new oil and gas discoveries are on the coastal plain and in the nation's offshore areas, particularly off the coast of California. At a time of continuing warfare in the Persian Gulf, it is essential that the United States assign the highest priority to finding and developing additional oil and natural gas resources within and adjacent to its borders. If the United States is to free itself of its dangerous overdependence on oil imports, we must move ahead with the task of finding and developing the potentially vast oil and gas resources off our coasts and beneath the ANWR coastal plain.

According to the U.S. Department of the Interior's recent report to Congress, the ANWR coastal plain "is rated by geologists as the most outstanding petroleum exploration target in the onshore United States" and is "exceptionally favorable for the discovery of one or more supergiant fields (larger than 500 million barrels)." Based on the geologic data it has gathered and analyzed, the department estimates that the coastal plain may contain recoverable oil resources of more than 9.2 billion barrels, an amount nearly equal to the Prudhoe Bay field, which is the largest U.S. oil discovery to date. Even the Interior Department's mean estimate of 3.2 billion barrels of recoverable oil would constitute the third largest oil discovery in U.S. history. Of course, the only way to find out how much oil is actually beneath the ANWR coastal plain is to drill for it, and that cannot be done until Congress authorizes oil and gas leasing there.

It is important that we fully understand the vast potential of the ANWR coastal plain for meeting U.S. energy needs. Some opponents of coastal plain leasing allege that even a major discovery there would provide only a few months supply of oil. Nothing could be more at odds with reality. The ANWR coastal plain has the potential for producing 150,000 to 600,000 additional barrels of oil per day for 20 to 30 years. Production of 600,000 barrels per day would put this single area among the top 20 countries in the world in terms of crude oil production.

Crude oil from the North Slope's producing oil fields contributes nearly 25 percent of current U.S. oil production. The nation's dependence on foreign oil could increase markedly in the years ahead, as these fields -- along with the older fields in the lower-48 states -- reach peak production and start to decline, as many already have. The United States must turn to Alaska's undiscovered oil and gas if our future energy security needs are to be met.

ANWR coastal plain development is particularly urgent after nearly two years of severely depressed economic conditions in the U.S. petroleum industry and the many service, engineering and construction companies which support petroleum operations. It is difficult to exaggerate the impact these depressed conditions have had on the petroleum industry and the oil-producing states. Hundreds of thousands of workers have lost their jobs. Thousands of oil firms and service and supply companies have gone bankrupt. Oil companies have been forced to dramatically reduce their spending on exploration and production projects.

While these depressed conditions have begun to alleviate somewhat in recent months, many major problems remain. The domestic petroleum industry clearly has not yet achieved recovery. Tangible signs of continued economic difficulty are plainly visible. Cash flow within the industry for new U.S. petroleum exploration and production remains weak. Drilling is half the level of 1985 -- which was already low; well completions during the first six months of 1987 were off nearly 30 percent from the same period in 1986; domestic oil production is down nearly 9 percent from the February 1986 peak; and more than 170,000 petroleum extraction workers have lost their jobs since 1985. Opening the ANWR coastal plain to oil operations would be an important step forward in energizing and rejuvenating the domestic petroleum industry and the hundreds of supplier and service companies which we represent.

Current U.S. energy supply trends underscore the urgent need to move ahead with oil and gas leasing on the ANWR coastal plain.

- Domestic oil production continues its downward spiral, a result of the downturn in oil prices, which saw the average price of domestic oil drop from $24.51 per barrel in December 1985 to less than $9.40 per barrel in July of last year.
- Domestic consumption of refined petroleum products rose sharply in 1986 and has continued to rise in 1987. So far this year, the United States has consumed some 800,000 barrels a day of refined oil products more than in 1985, before the dramatic decline in domestic crude oil prices.
- As a result of this lowered production and growing consumption, oil imports have been rising at an alarming rate. U.S. oil imports were up 25 percent in 1986 and imports from the war-torn Persian Gulf area increased by 200 percent. In August of this year, imports amounted to some 7.4 million barrels a day -- or 44.4 percent of total U.S. demand. Much of that oil came from the Organization

of Petroleum Exporting Countries -- the OPEC oil cartel -- including substantial imports from the Persian Gulf.

- Unless we renew our efforts to locate domestic energy resources, our dependence on foreign oil could soon top the 50 percent mark and rise to more than two-thirds of the oil we use by the year 2000 -- just 13 years from now.

We believe our nation cannot afford to exclude the ANWR coastal plain from efforts to find and develop the domestic energy resources so urgently needed to meet our future needs. The alternative is continued and growing dependence on oil imports and increased risk of energy supply disruptions of the type experienced in the 1970s.

We are aware that some environmental groups have expressed concern as to the impact of oil and gas operations on the sensitive ecology of the ANWR coastal plain. We believe that experience and new technologies derived from 20 years of North Slope operations ensure that oil and gas activities can be conducted in harmony with the arctic environment and wildlife. Any impact from oil and gas exploration would be limited and temporary. Based on North Slope experience, less than 23 square miles -- or under one-tenth of one percent of ANWR -- would be involved in development activities if a major find resulted. If no significant discoveries are made, petroleum activities will cease, there will be no appreciable risk of environmental damage, and the land will be restored.

The U.S. Fish and Wildlife Service will monitor all activities on ANWR, as will the State of Alaska and the local North

Slope Borough. The Fish and Wildlife Service monitored recent geophysical operations in ANWR and reported that no significant environmental impact resulted from that activity. It should be noted that operations on the coastal plain would not affect the 9 million acres of wilderness lands within ANWR -- including the 450,000 acres of wilderness on the ANWR coastal plain.

Finally, we should understand that oil development activities have been conducted on the North Slope for nearly two decades without harm to caribou or other arctic wildlife. There is no reason to believe such activity on the ANWR coastal plain would pose any threat to the caribou population or other wildlife in that area. Most strikingly, the Central Arctic caribou herd, which some thought would be harmed by development in the nearby Prudhoe Bay area, has more than quadrupled in size -- growing from about 3,000 animals in 1970 to about 15,000 in 1985, according to the Interior Department report to Congress.

Clearly, there are no environmental reasons not to proceed with oil and gas leasing on the ANWR coastal plain -- and there are critically important energy and economic reasons for moving ahead with this leasing without further delay.

This vitally needed petroleum development will not only help meet America's energy needs in the 1990s and beyond; it will also bring important economic benefits in terms of jobs and business for virtually every state in the union -- and it will mean increased leasing revenues, royalties and other funds for the federal government. These are significant benefits which frequently are overlooked in the debate over whether to open the ANWR coastal plain to oil and gas leasing.

For example, between 1980 and 1986, major oil companies operating on the North Slope spent more than $10.6 billion in the United States on the development of those oil fields. Every state in the union took part in supplying goods or services. There also was a geographic diversity to where the spending occurred. For example, the states with the largest expenditure totals included Texas, $3.48 billion; California, $1.82 billion; Alaska, itself, $1.35 billion; Washington, $764.8 million; New York, $541.2 million; Oklahoma, $442.8 million; Colorado, $245.8 million; Wisconsin, $183 million; Pennsylvania, $175.5 million; Louisiana, $147.6 million; Utah, $146.5 million; Oregon, $128 million; and Illinois, $126 million.

Workers in every state in the union have helped provide the equipment and supplies to explore the North Slope, drill the wells, build the pipeline and construct the ships used to transport the oil produced on the North Slope to refineries in the lower-48 states. Based on a peak annual expenditure of about $4 billion for Alaska North Slope oil development, it is estimated that more than 39,000 direct and 29,000 indirect U.S. jobs have been created in providing goods and services for those operations.

The American Petroleum Institute has estimated that, based on an ANWR coastal plain peak production of between 350,000 and 2.7 million barrels of oil daily, projected employment gains would range between 138,000 to more than 1 million jobs, and the gross national product would increase from 0.14 percent above the levels that would otherwise be the case.

If the coastal plain were leased and a major oil field discovered, sizeable royalty payments would be generated. The distribution of the potential revenues among the federal, state and local governments depends on the details of how the area is leased. But the resulting revenues would be significant -- in 1984 alone, Alaska received some $1.4 billion in oil and gas royalties, rent and bonuses from leases on its own lands.

In summary, Halliburton Company and the Petroleum Equipment Suppliers Assocation believe that the Interior Department is right in recommending the opening of the ANWR coastal plain to oil and gas leasing. We urge Congress to enact the legislation required to carry out DOI's recommendation. At a time of continuing political chaos and warfare in the Middle East, we have no choice but to find and develop the oil and gas resources within our borders. The ANWR coastal plain is the place to start.

10/13/87 OBI: 67-16

Senator McCLURE. Thank you.

Mr. Fleetwood.

STATEMENT OF ALVIN H. FLEETWOOD, ON BEHALF OF THE ALASKA STATE CHAMBER OF COMMERCE

Mr. FLEETWOOD. Yes, thank you, Senator McClure.

I am Al Fleetwood, and I represent the Alaska State Chamber of Commerce, and I appreciate the opportunity to be here, and I appreciate your sticking by to hear our testimony.

My organization represents 1200 businesspersons from all over Alaska, and that is from Nome to Ketchikan, and superimposed on a map of the United States, this would be an area that would stretch from New York to Los Angeles, with interests just about as diversified as you would find in this country, and I do not mean that as a separate part of the United States.

But anyway, I just want you to know that it is the Alaska State Chamber's studied, and I emphasize studied, and unanimous position that we support Senate Bill 1217. Alaskans are rightfully proud of the petroleum resource development that has taken place on our North Slope, and do not think for a moment that we did not monitor this entire developmental process. Of course we are pleased by the great economic benefits that have accrued to our state as a result of this development. However, Alaskans know that ultimately nothing can survive in the Arctic unless we adhere to the strictest of environmental practices, and Alaskans simply will not sell out for any price.

This summer when a number of your colleagues and your staffs and other parties, including the media, visited Alaska and the North Slope, several accused us of having only self-centered and economic interests for opening the Coastal Plain, and this simply is not true. And the remarks hurt, but only because we are so sensitive to our land and our environment, and I believe that that shows.

Sure, just like in Texas and Oklahoma and Louisiana and other oil-producing states, Alaska's economy is hurting right now. But the current operating results and prospects for our fishing and timber and tourist industries are exceedingly bright. So our future looks good.

So put that aside, and let's not isolate Alaska from the United States economic scene simply because this simply is not how economics works.

With the depletion of proven energy reserves across the United States and our daily production continuing its decline, it is imperative to sustain that throughput of the Trans Alaska pipeline system, and with Alaska providing 24 percent of our domestic production, North Slope oil simply becomes an increasingly important commodity to our nation.

But with the existing North Slope production beginning its inevitable decline within two years, the timely leasing of the Coastal Plain is an absolute necessity for Alaska to continue to supply its significant share to our nation's production. And I think it is somewhat disturbing to me, and it was pointed out today, but all of you are knowledgeable to the issue, but repeatedly we have heard the assumption expressed that authorization of the leasing of the Coastal Plain for oil and gas exploration and development means production for today, and it just cannot do that because the 10 or 15 year period required for the development of the Arctic simply means that we must proceed now to encourage the exploration of not only the Coastal Plain, but particularly the Coastal Plain, but really of all prospective Federal lands.

So there is urgency involved. And currently our nation depends upon foreign resources for over 42 percent of our crude supply, and this percentage, as we know, increases daily. So in national interest we must develop more domestic reserves and decrease our reliance on foreign supplies, and we all know the economics of this entire scenario. Basic economics simply indicates that the Coastal Plain resources could provide the lower prices for domestic consumption and cut America's energy bill for imported oil, and it is indicated that out of this Coastal Plain, that cut would amount to about $38 billion a year, and that is a lot of money.

So going around with the basic economic circle, this would, of course, lower American production costs and increase our productivity, and of course, our products would become more competitive in world markets.

The opening would create jobs throughout the United States. And when you have time, I ask that you please refer to the map that I furnished with my testimony, and you probably have seen it already. This map shows the amount of the North Slope Alaska oil development dollars spent in each of the states in our United States between the years of 1980 to 1986. And because this $10 billion total represents only the costs incurred after the computer programs were installed, it represents only about a third of the estimated $36 billion total pipeline exploration and developmental costs. So that is relatively insignificant for the total cost of everything that has gone up there.

So when you analyze the expenditures for equipment and supplies and worker salaries and what these mean to the individual states' economies, you can see that opening of the Coastal Plain is a significant economic factor to each state in our Union.

And in my testimony, but I think it bears repeating because his visit was so timely, former EPA Chief William Ruckelshaus was in Alaska just last week, and in an address to our Chamber he said about ANWR, not only can we have a healthy environment and a health economy, but if we do not have both, we will not have either.

What he basically said is that the more environmental quality we can afford, the more we will have, and it is as simple as that. The oil industry has shown that it can operate on the North Slope with reasonable environmental costs, yet the opponents of Senate Bill 1217 would have us sacrifice billions of dollars each year in gross national product for only minimal environmental mitigation, and this kind of extremism is simply unaffordable.

In the long term, people will not support unaffordable environmental policies, and the danger is the legitimate, critical environmental needs will be overlooked in the backlash.

So thank you very much for hearing me out today, and in the long run we must recognize that a healthy environment does indeed require a healthy economy, and that is what this whole thing is all about.

I am glad I was here.

[The prepared statement of Mr. Fleetwood follows:]

TESTIMONY BY
ALVIN H. FLEETWOOD
REPRESENTING THE
ALASKA STATE CHAMBER OF COMMERCE
BEFORE THE
SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES

October 14, 1987

Good morning Mr. Chairman. I am Alvin H. Fleetwood representing the Alaska State Chamber of Commerce and it was pointed out to me that in one more week, I will have been an Alaskan resident 30 years.

The Alaska State Chamber supports Senate Bill 1217 which calls for the exploration, production and transportation of the oil and gas resources within the Coastal Plain of ANWR. Oil and gas development of the Coastal Plain would help meet future energy requirements; strengthen the national economy; reduce the nation's dependence on foreign oil; improve the balance of trade; create U.S. jobs; and provide a large and greatly needed source of income to the federal and Alaska treasuries.

It is generally conceded that the ANWR Coastal Plain overlies the nation's most promising onshore frontier for giant oil and gas prospects. Although expert opinion is divided over the size of petroleum resources in an undrilled area, the U.S. Geological Survey estimates a 95 percent chance of the presence of more than 4.8 billion barrels of oil and the possibility of several times that amount. No meaningful evaluation of the reserves of the Coastal Plain can be made without a calculated and comprehensive exploratory drilling program.

Proven energy reserves across the U.S. are being depleted and the country's daily production is continuing its decline. The maintenance of the throughput of the Trans-Alaska Pipeline System of

ABOUT 20 PERCENT OF DOMESTIC PRODUCTION THEREFORE, BECOMES EVER INCREASINGLY IMPORTANT TO OUR NATION. BUT THE EXISTING NORTH SLOPE PRODUCTION WILL BEGIN ITS INEVITABLE DECLINE WITHIN TWO YEARS. TIMELY LEASING OF THE COASTAL PLAIN IS ABSOLUTELY NECESSARY FOR ALASKA TO CONTINUE TO SUPPLY A SIGNIFICANT SHARE OF THE NATION'S PRODUCTION.

AUTHORIZATION OF LEASING OF THE COASTAL PLAIN FOR OIL AND GAS EXPLORATION AND DEVELOPMENT DOES NOT MEAN PRODUCTION FOR TODAY. BECAUSE OF THE 10 TO 15 YEAR PERIOD REQUIRED FOR DEVELOPMENT IN THE ARCTIC, WE MUST PROCEED NOW TO ENCOURAGE EXPLORATION OF ALL THE MOST PROSPECTIVE FEDERAL LANDS, ESPECIALLY IN THE COASTAL PLAIN. THIS PROCESS COULD BE CONSIDERED A NATIONAL ENERGY INSURANCE POLICY FOR OUR FUTURE.

CURRENTLY THE NATION DEPENDS ON FOREIGN SOURCES FOR 47 PERCENT OF OUR CRUDE OIL SUPPLY , AND THIS PERCENTAGE OF DEPENDENCE INCREASES DAILY. IN THE NATIONAL INTEREST WE MUST DEVELOP MORE DOMESTIC RESERVES AND DECREASE THE RELIANCE ON UNSTABLE FOREIGN SUPPLIES. THE INCREASING DEMAND FOR FOREIGN CRUDES HAS RESULTED IN A TRADE DEFICIT THAT IS A MAJOR NATIONAL PROBLEM RECOGNIZED BY CONGRESS. OIL FROM THE ANWR COASTAL PLAIN OFFERS ONE OF THE BEST SOLUTIONS FOR PART OF THIS PROBLEM. IT COULD PROVIDE A SECURE SUPPLY AND AT THE SAME TIME DECREASE THE RATE AT WHICH THE DEFICIT IS INCREASING.

OIL FROM THE ANWR COASTAL PLAIN WOULD PROVIDE MANY AND SIGNIFICANT BENEFITS TO THE COUNTRY AS A WHOLE. IT HAS BEEN STATED BY MR. CHARLES DIBONA OF THE AMERICAN PETROLEUM INSTITUTE THAT ONE MILLION BARRELS PER DAY OF PRODUCTION FROM ANWR COULD HOLD THE DOMESTIC OIL PRICE $9 PER BARREL BELOW WHERE IT WOULD OTHERWISE BE. IN OTHER WORDS, FAILURE TO ADD 1 MILLION BARRELS PER DAY OF DOMESTIC PRODUCTION WOULD GIVE OPEC ANOTHER $9 PER BARREL OF PRICING POWER. AND WE ALL KNOW WHAT THAT WOULD MEAN.....ANOTHER PERIOD OF WAITING IN LINES AT GAS PUMPS AND A RENEWED BOUT OF NATIONAL INFLATION OR RECESSION.

By contrast, opening the Coastal Plain to exploration may well provide lower oil prices for domestic consumers and cut America's energy bill for imported oil by 38 billion dollars a year. Further, lower priced oil would reduce costs to American industry and make our products more competitive on world markets, and with lower operating costs our industries would become more productive.

Opening the ANWR Coastal Plain to exploration and development would generate income and create jobs throughout the United States. Based on an offshore resource and jobs model by Battelle Pacific Northwest Laboratories, it has been estimated that as many as a quarter million jobs nationwide could be created by the year 2005 by opening the Coastal Plain of ANWR and workers' income could be as much as six billion dollars per year as a result.

A recent study on the expenditures to maintain and further develop production on the North Slope during just the years 1980-1986 showed expenditures of about 10.5 billion dollars. Actually the total cost exceeds by three times the $10 billion total on this sheet because these represent only the costs incurred after computer programs were installed. Expenditures for equipment, supplies and workers' wages were spread across all states and the District of Columbia, as shown on the attached map. Total expenditures for TAPS and oil field exploration and development on the North Slope through 1985 has been estimated at 36 billion dollars. The development of ANWR could mean similar economic benefits across the U.S.

The Alaska State Chamber of Commerce believes that the North Slope experience shows with reasonable assurance that development can occur in the Coastal Plain in harmony with the natural environment and wildlife. The Section 1002 report provides the environmental basis to proceed now with leasing without further study. We strongly support Senate Bill 1217 and urge this committee to take early action in the process to pass legislation to open the Coastal Plain to greatly needed energy resource development.

IN CLOSING, I WOULD LIKE TO QUOTE A STATEMENT MADE BY FORMER EPA CHIEF WILLIAM RUCKELSHAUS LAST WEEK ABOUT ANWR. HE SAID "NOT ONLY CAN WE HAVE A HEALTHY ENVIRONMENT AND A HEALTHY ECONOMY BUT IF WE DON'T HAVE BOTH, WE WON'T HAVE EITHER". WHAT MR. RUCKELSHAUS SAID IS THAT THE MORE ENVIRONMENTAL QUALITY WE CAN AFFORD, THE MORE WE WILL HAVE.

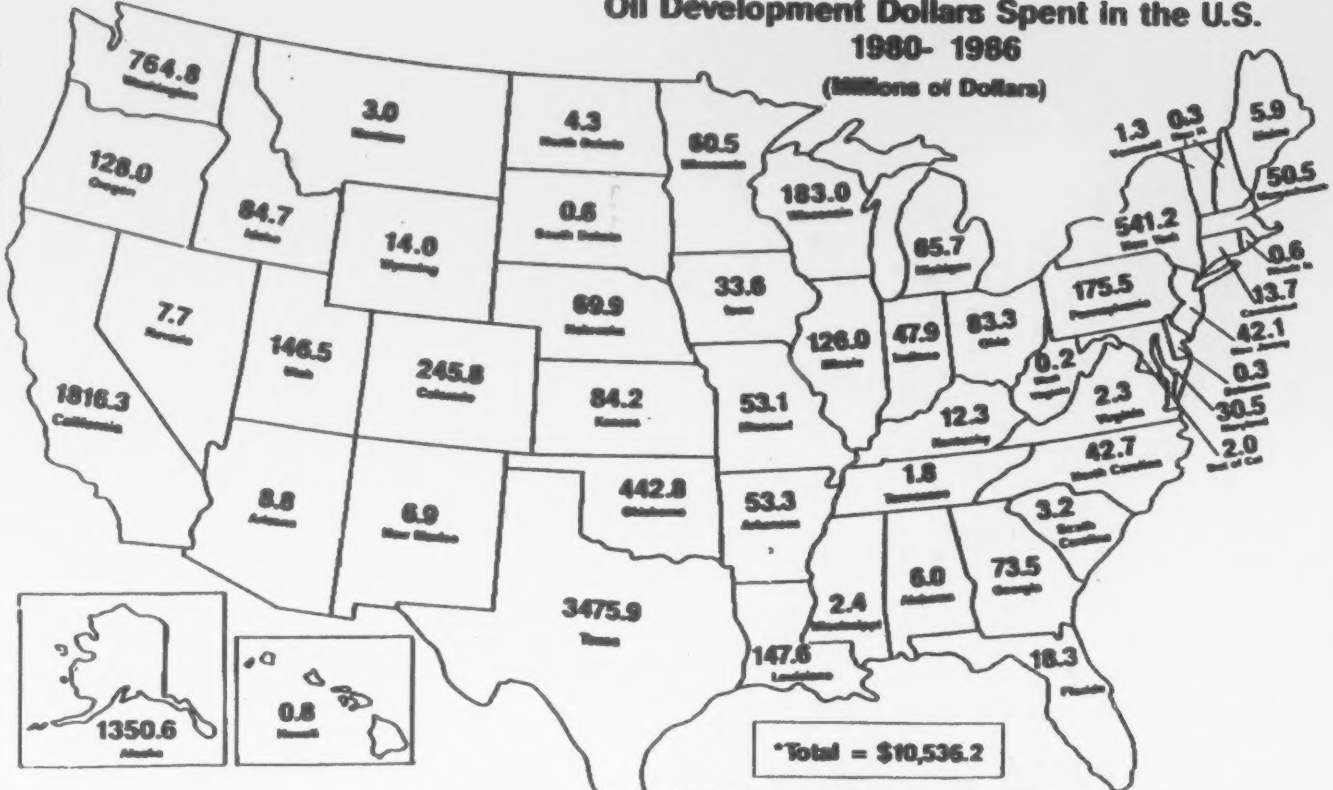
THE OIL INDUSTRY HAS SHOWN THAT IT CAN OPERATE ON THE NORTH SLOPE WITH REASONABLE ENVIRONMENTAL COSTS. YET, THE OPPONENTS OF THIS BILL WOULD HAVE US SACRIFICE BILLIONS OF DOLLARS EACH YEAR IN GROSS NATIONAL PRODUCT FOR ONLY MINIMAL ENVIRONMENTAL MITIGATION. THIS KIND OF EXTREMISM IS UNAFFORDABLE. IN THE LONG TERM, PEOPLE WILL NOT SUPPORT UNAFFORDABLE ENVIRONMENTAL POLICIES, AND THE DANGER IS THAT LEGITIMATE CRITICAL ENVIRONMENTAL NEEDS WILL BE OVERLOOKED IN THE BACKLASH.

MR. CHAIRMAN AND MEMBERS OF OUR UNITED STATES SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, I SUBMIT TO YOU THAT SENATE BILL 1217 IS BALANCED LEGISLATION THAT ULTIMATELY WILL HELP THE AMERICAN PEOPLE TO AFFORD ENVIRONMENTAL PROTECTION. IN THE LONG RUN, A HEALTHY ENVIRONMENT DOES INDEED REQUIRE A HEALTHY ECONOMY.

THANK YOU.
ALVIN H. FLEETWOOD

NS10:1014

North Slope Alaska
Oil Development Dollars Spent in the U.S.
1980- 1986
(Millions of Dollars)


764.8 Washington
128.0 Oregon
1816.3 California
7.7 Nevada
84.7 Idaho
3.0 Montana
14.0 Wyoming
146.5 Utah
245.8 Colorado
8.8 Arizona
6.9 New Mexico
4.3 North Dakota
0.6 South Dakota
69.9 Nebraska
84.2 Kansas
442.8 Oklahoma
3475.9 Texas
60.5 Minnesota
33.6 Iowa
53.1 Missouri
53.3 Arkansas
147.6 Louisiana
183.0 Wisconsin
126.0 Illinois
65.7 Michigan
47.9 Indiana
83.3 Ohio
12.3 Kentucky
1.8 Tennessee
2.4 Mississippi
6.0 Alabama
73.5 Georgia
18.3 Florida
3.2 South Carolina
42.7 North Carolina
2.3 Virginia
0.2 West Virginia
175.5 Pennsylvania
541.2 New York
1.3 Vermont
0.3 New H.
5.9 Maine
50.5 Massachusetts
0.6 Rhode Is.
13.7 Connecticut
42.1 New Jersey
0.3 Delaware
30.5 Maryland
2.0 Dist of Col
1350.6 Alaska
0.8 Hawaii

*Total = $10,536.2

* This total excludes about $7 billion spent on intangible items for Kuparuk, East Prudhoe Bay, and Lisburne oil fields.

Senator McCLURE. Thank you very much, Mr. Fleetwood.

I have only a couple of questions or comments.

Mr. Crandall, I want to make certain that I understand the thrust of what you are saying.

Your organization supports the opening of the 1002 area.

Mr. CRANDALL. That is correct, Senator.

Senator McCLURE. And if I understand it correctly, it is because of the concern that your membership has with respect to the availability of energy for the activities which your membership undertakes.

Mr. CRANDALL. That is correct. Virtually every recreational activity is dependent upon liquid fuels in some respect, either getting to the recreation site or in the recreation activity itself.

Senator McCLURE. And it is not just the pricing of that commodity, it is availability.

Mr. CRANDALL. That is right. As the Senator remembers quite well, we discovered there is a fair amount of elasticity in terms of the willingness to pay, but when people are unable to plan on traveling from California to Idaho or wherever, they simply will not make the journey, they will not buy the boat, they will not buy any other recreation products. There was tremendous economic dislocation.

Senator McCLURE. Mr. Watson, your statement focused primarily on the cost of energy as a function of doing business on the farm. It also related to the environmental concerns that rural Americans have always expressed with respect to the uses of lands. I commend you for that latter statement in particular because it is so obvious it is often overlooked and needs to be restated.

But I wonder if it is not equally important, not just the cost, but the question of availability because I remember when we did not have it available. When my telephone was ringing off the wall with farmers who had equipment idle in the field they could not move, it was not just a question of price, because they would have paid a great deal to have enough energy at that particular time in order to move their equipment, but they could not get it at any price.

Mr. WATSON. Availability is an important measure of concern for rural America, particularly farmers, because they are often at the end of the pipelines or the distribution systems. They are usually the last ones out, farther away. They have to use more energy in order to acquire energy and make energy availability possible. So it is definitely deeply intertwined in rural America, that availability of having the energy.

Senator McCLURE. If you have a shortage of energy and close down a factory for a week, that factory has lost 1/52 of its product for the year. If you close down a farm for the wrong week, you lose 100 percent of the production for the year.

Mr. WATSON. Well, when it is time to milk the cows and you flip the switch on the milking parlor milking machine, you have got to have the energy to run that machine, or you have got a lot of——

Senator McCLURE. You mean the cow will not wait a week?

Mr. WATSON. No, I am afraid not.

Senator McCLURE. She is going to complain about something.

Well, I think that the assured availability of energy at critical times, whether it be the daily cycle in the milking parlor, the annual cycle with respect to getting the crops in the ground, or the irrigation load that may occur at a critical hot period in August, if you do not have the pumps turned on right then and the water available right then, 100 percent of the year is gone.

The same thing with respect to the harvest in the fall. There are time periods that are critical, perhaps more so to farming than there are to many other industrial enterprises in which you can turn it on or turn it off with less long term consequence.

So availability seems to me to be a high priority with respect to farm operations.

Mr. WATSON. Yes, sir.

Senator McCLURE. Thank you, gentlemen. I have no further questions.

Senator Murkowski.

Senator MURKOWSKI [presiding]. Thank you, Mr. Chairman.

Mr. Jones, I am interested in, after reviewing your statement, just a few comments. Since your particular firm, Halliburton, is one of the larger engineering, oil field services supply firms, and the fact that we have substantially less drilling rigs active in the United States and so forth is a reality. There was discussion by former panel members about the uniqueness of the type of equipment required in the Arctic and the fact that, you know, you just did not move up rigs; these were expensive rigs, they were a special type of rigs built for the Arctic.

Could you comment on your capability to drill, say, in ANWR under the restrictions that would probably be placed on that type of drilling, or I do not know whether you did any contractual work for Chevron when they drilled up there. And the technology that has been developed, say, in the last decade or so that would indicate your company's capability currently to, I guess, leave a smaller footprint today than you may have left 15 years ago in Prudhoe Bay.

Mr. JONES. Yes. Our company does not build drilling rigs, but we have service equipment which operates at the drilling site and in the production phase of the wells, and we have had over a period of years, in fact, from the time when North Slope development first started, we have had joint research projects, and we have worked with and for each of the major oil companies operating in that area. And technology changes is something that has had a real impact on both the expense of doing the work and also the capability to do it well and in a short period of time, in these hostile environments.

In fact, most of the equipment and most of the materials which are used in those operations are specially developed for that, not only by our company, but by other service companies as well. And those developments have continued through the years, and there has been significant improvement from 10 or 15 years ago, and we would expect there would continue to be improvements as that work goes along.

We do not know of anything from a service company standpoint, you know, it would certainly be a better situation than it was in the Prudhoe Bay, which worked out very well.

Senator MURKOWSKI. Thank you very much, Mr. Jones.

Mr. Crandall, I was reading your statement with great interest until I got to about the last page, and then I noted your support for legislation that would ensure that some of the Federal receipts derived from ANWR leasing would enhance our natural resources, and you went on further to describe the specifics, and as you know, traditionally, Alaska, as a consequence of the Mineral Leasing Act and the Statehood Act received 90 percent of the revenues, and the Federal Government 10.

I guess my question is, has your organization done any legal analysis, or do you intend to, on the ability of Congress to change the oil and gas revenue sharing formula between the Federal Government and the State of Alaska?

Mr. CRANDALL. What we would suggest is that that issue has not been raised by Senator Johnston's bill, and we would be supportive of looking at the volume of dollars that would be attributable to the oil and gas leasing within the Arctic National Wildlife Refuge. We believe that there are great national needs that could benefit from the reinvestment of the receipts from a nonrenewable resource such as the oil and gas below the Arctic National Wildlife Refuge, and that if it were appropriate, the existing division of the Federal receipts should be amended.

Senator MURKOWSKI. Well, I have no problem with the existing division of the Federal receipts as they currently are. They can take that 10 percent and do anything they want with it, but I do have a violent objection to changing the formula, and I guess my question has been answered, that your organization in fact has done no legal analysis, then, of the ability of Congress to change the existing formula.

Mr. CRANDALL. No.

Senator MURKOWSKI. Mr. Fleetwood, I appreciate your testimony, and inasmuch as you are the only Alaskan on the panel, and have had an opportunity to observe the discussion over the caribou calving and the reality that oftentimes when one comes to Congress for a solution, more often than not if there is any way to develop your own solution and present it to Congress, why, sometimes it is not only more expedient but more practical for all those concerned, and I am wondering if in your estimation, since you are aware that the State's position is to withhold some 242,000 acres, we have had witnesses that suggest that we lease it, the portion of the Jago River area up front, and the summertime drill, the drill it first, drill it last, and this matter is hanging before this committee, and the Chairman has indicated his opinion, I think it is fair to say, you either put it up for lease or you do not. Back home we have a little problem here to try and address whether or not we can conceivably come up with something that we can support since it is our basic concern, the industry, the environmental community, the State of Alaska and others.

Do you see any possibility or likelihood, Mr. Fleetwood, that your group, the Alaska State Chamber or others, can work with industry and the State in order to get a cohesive position on this before you get a dictate from this committee?

Mr. FLEETWOOD. First of all, in regard to the caribou, although the Coastal Plain is so inaccessible, I have not witnessed the caribou there, but you know, a caribou, nothing is going to stop a caribou from going anywhere that caribou wants to go.

Senator **MURKOWSKI**. Something like a gorilla?

Mr. **FLEETWOOD**. It is unbelievable, and I have seen them in almost every circumstance throughout the entire State.

I guess Alaskans are a little disturbed for the simple reason that everybody is addressing the study of the Coastal Plain as something brand new. You know, we have been going through this very same study for 15 years in Alaska. That was through the development of Prudhoe Bay and all of that.

As just a person and a businessperson, we just cannot understand why everything has to be repeated and repeated when the results in actual operation are proven; they are just downright proven.

And it just is certainly not economic. And it is difficult for the person on the street and the businessperson and the Alaskans to understand what all is going on. And also—and this is probably an unpopular remark here right now, but why in the blazes does it have to be so political?

Senator **MURKOWSKI**. Because this is a political body.

Mr. **FLEETWOOD**. Well, that is why it is so unpopular here. And I cannot help but feel that our Governor would back off of the caribou situation if he could possibly—I am being totally candid now—if he could get out of it.

I do not know that that is so or not, but certainly he is not supported by the bulk of Alaskans.

Senator **MURKOWSKI**. You are probably safe with that statement because the media is gone by now.

I guess my last observation, and it is not a question, is simply it appears to this Senator that there is a need for somebody in Alaska or some group to pick up the issue and try and get the parties together, and sometimes the old kicker of throwing everybody in a room and not letting them out until you get some kind of a compromise might be extreme, but it appears that there is a necessity of getting something going on that.

Mr. **FLEETWOOD**. I can expand on that one bit by being with the Governor last week in Juneau, and he said he feels like it is no longer an issue, and dispense it with that. And whatever that——

Senator **MURKOWSKI**. Well, that is fine, but I think it is an issue before this committee because, you know, it is a question of do we take up the entire area for lease or do we exclude that Jago River area, and we have heard the State's witnesses who have indicated a concern, and I am not downplaying it. It is a valid consideration in this proposed legislation, and that we are going to have to address it, and I guess what I am asking for is if there is any voluntary leadership corps out in the State that wants to try and take a handle on it and get everybody together.

Mr. **FLEETWOOD**. Thank you for the challenge, Senator.

Senator **MURKOWSKI**. I want to thank the witnesses on behalf of our Chairman, Senator Bennett Johnston, and I believe the ten day period is the open time of the record.

I want to thank the staff and thank you gentlemen and wish you a good day, and the hearing is concluded.

[Whereupon, at 12:53 p.m., the hearing was recessed to reconvene Thursday, October 15, 1987.]

ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987

THURSDAY, OCTOBER 15, 1987

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:42 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The CHAIRMAN. Good morning.

This is the third hearing we have scheduled on S. 1217, Senator Murkowski's bill to open the coastal plain of ANWR to oil and gas drilling, production and development. We have one more general hearing on this issue scheduled for next Thursday.

I look forward to hearing from the witnesses today regarding the specifics of the Murkowski bill or any other suggestions you might have on what items we should consider including in our legislation. We are asking the witnesses to please summarize their statements as the complete written testimony will be included in the record as if read.

I want to apologize in advance because I am going to have to be on the floor as soon as this vote is over with on the HUD and independent agencies appropriation bill. I hope I will be able to come back as soon as that first amendment is over with. But I can stay for a few more minutes, and then there will be other committee members who will be here.

We would like to begin with a panel composed of the Honorable Joseph L. Fisher, Former United States Congressman; Lisa Speer, Senior Project Scientist from the Natural Resources Defense Council; Karin Sheldon, Chairperson of the Board of Directors of the Defenders of Wildlife; Milton Freeman, Anthropology Professor from the University of Alberta. Ladies and gentlemen, we are delighted to have you here, and I understand that we will lead off with Ms. Sheldon. Welcome to the panel.

STATEMENT OF KARIN SHELDON, CHAIR, BOARD OF DIRECTORS, DEFENDERS OF WILDLIFE

Ms. SHELDON. Thank you, Senator. Good morning, Senator. It is a pleasure to be here this morning.

As you indicated, I am Chairperson of the Board of Directors of Defenders of Wildlife, which is a national nonprofit environmental group of 80,000 members dedicated to the preservation and conservation of wildlife and its habitat.

I am also staff attorney with the Sierra Club Legal Defense Fund in Denver, and in that capacity I represent the Sierra Club, the Wilderness Society, and other environmental groups in litigation concerning our public lands. Much of my practice concerns protecting those public lands from the impacts of oil and gas exploration. I would say that I have had over the past 10 years or so a great number of cases that have dealt directly with the on-shore leasing system, primarily noncompetitive leases in the lower 48 States. And it is based on that experience that I want to speak with you this morning.

Defenders of Wildlife opposes the Murkowski bill as we would any bill that would open up the arctic coastal plain for oil and gas development. In our view, if passed and implemented, the Arctic Coastal Plain Public Lands Leasing Act would permanently and irrevocably change this splendid wild and untrammeled place, perhaps the very last one of its size and quality on earth, to a gigantic industrial complex. It is not possible, nor will it be possible, to develop giant and super giant oil fields in an environment as fragile, complex and priceless as the arctic coastal plain without irreversible damage. Such damage is inevitable. It goes with the nature of the activities involved in oil and gas development and with the characteristics of the environment in which the exploration and development takes place.

Now, I realize that is a tough message. It is tough message for me to deliver, and it is a tough problem for you as congressional decision makers. In our view it is vital that the decision be faced squarely, that we not hide from the inevitable results of opening this area to oil and gas exploration and development with some notion that we can do it in an ecologically sound manner. We can try our best to minimize the effects of oil and gas development in this area, but the result of this will be, as I said, to change this area to an industrial complex and to lose what is there presently probably forever.

I would like to focus this morning on the reasons for our opposition primarily based on my experience with oil and gas leasing in the lower 48 States. As I said, my experience comes from noncompetitive leasing although the system proposed in the Murkowski bill will be for a competitive leasing system. And while I think that that is an improvement in terms of return to the Treasury, it actually adds some additional concerns in terms of protecting the environment.

The bill calls for the use of stipulations and conditions to be included in oil and gas leases in order to minimize or ameliorate the environmental consequences of the exploration and development activities. Our experience with conditions and stipulations in oil and gas leases gives us no confidence that this is an effective way to prevent, limit or condition the environmental damage which does result from oil and gas exploration and development. The lesson that we have learned is that you simply cannot have it both ways. If irreparable damage is to be avoided in areas that are environmentally sensitive or environmentally important, as the arctic coastal plain is, then those areas should not be leased at all.

Now, my analysis of stipulations basically would be a failing report card on this means of protecting the environment. I would have to give stipulations and conditions three E's, and those three E's are problems with their enforceability, the economics of using them, and their effectiveness. I would like briefly to consider each one of these, and then I would very much welcome your questions about my comments.

The central question in the use of stipulations to constrain oil and gas exploration and development activities is whether they are enforceable at all. And this has two aspects. The first is whether the Department of the Interior will require compliance with the stipulations that have been included in leases, and the second is whether a lessee is legally bound by stipulations when those stipulations do impact the exercise of lease rights in a significant way.

We have found that the oil industry's willingness to accept stipulations in the lower 48 States in very large part is due to the fact that most stipulations are waivable. They will be removed from a lease if the lessee is able to demonstrate that they are too costly or too difficult to comply with. If it makes the exercise of lease rights a very expensive proposition or difficult or impossible to do, then stipulations will be removed.

And that is true even for the most restrictive stipulations, including what is called the "no surface occupancy stipulation" which actually prohibits a lessee from occupying any portion of the surface of the leasehold. Most of these stipulations are written explicitly as waivable, as conditional, and even those that are not explicitly termed this way are waivable at the request of the lessee to the land managing agency.

This is understandable. Stipulations often put the industry in a bind and put the agency in a bind. The industry has been given lease rights to explore for and develop oil and gas. The terms of the leases are explicit in that regard. Stipulations are added to the top of this basic right, and the land manager, when faced with the lessee having the right to explore for and develop oil and gas, and the stipulation which appears to curtail, retrain or possibly prohibit the exercise of that right, must make a decision. And in our experience most often the decision is to waive the stipulation. If the lessee cannot drill and comply with the stipulation, it will be the stipulation that goes.

One example of this is included in my testimony. There are many, many others ongoing. And the net result of operating with stipulations is most often that the stipulation is waived and development proceeds with its concomitant impacts.

The second question in terms of the enforceability of stipulations relates to the whole issue of the taking of property rights and whether stipulations represent an unconstitutional taking. This we find is an issue that is not fully resolved either by decisions of the Interior Board of Land Appeals or by the courts. We have numerous decisions of the IBLA that have held that stipulations may restrict or control the timing, the method or manner of exploration and development as long as they do not impair the underlying rights of the lessee to explore for or develop his oil and gas. And that means that if it becomes too expensive in the lessee's eyes or too difficult, then the stipulation is one which impairs his underlying rights and is a taking of the property right that was granted in the lessee.

There is a division in the courts on this issue, and when there is such a decision, we are gambling in an irresponsible way with very precious resources. We find that the more important the resource, the more stringent the stipulation must be to protect it and, unfortunately, the more problematic that the stipulation will, in fact, be enforceable to achieve that goal.

So, for those two reasons, questions of enforceability, we are less than confident about relying upon stipulations to do the trick, to protect environmental resources.

Our concerns are not baseless. We find that the oil industry is often very opposed to restrictive stipulations particularly in places where it is difficult to drill and explore anyway. And the Alaska Oil and Gas Association, as noted in my testimony, has made its views known and is currently involved in an effort to have stipulations of the precise kind which would have to be included in leases in the arctic coastal plain removed from leases elsewhere in Alaska.

One of the reasons for the industry's opposition to stipulations is our second concern, the second E of the three E's, our second concern about relying on stipulations to protect the environment, and that is the cost. Mitigation is very, very expensive. The inclusion of provisions in leases to protect the environment is an extremely costly matter. And this is particularly true when the environment is very sensitive and when it is an environment that is difficult to drill in.

The issue of whether it will even be economic to attempt environmentally sound exploration and development in the arctic coastal plain was not addressed in the Murkowski bill or in the legislative environmental impact statement prepared by the Department of the Interior. A whole host of mitigation measures have been suggested in that document. Not one of them has any cost figures attached to it. There has been no demonstration that any of them makes economic sense or if, when they were all added on to leases in the arctic coastal plain, the industry could even economically explore for and develop the resource.

Mitigation, as I said, is very costly. And if we are going to use that as the means of protecting this environment, then we ought to know whether we can do it and do it effectively.

Well, if stipulations are not enforceable or there is some question about that and they are not economic, do they even work? That is the third E in our three E's of concern about the reliance on conditions and stipulations to promote environmentally sound exploration and development.

Mitigation of environmental effects, particularly the impacts on wildlife, are possible only in certain kinds of environments. And we have detailed those in our testimony. And I am sure that you will receive some additional testimony about them.

But choosing a set of mitigation measures and including those either in the lease conditions or possibly in the legislation without a demonstration of effectiveness is a very problematic matter, indeed. Our experience in the lower 48 States is that mitigation is iffy at best and often does not work. And again, we are relying in this bill and in the legislative environmental impact statement which supports it on measures that have not been proven. We have a number of instances which we can describe for the committee, should it wish to hear about them, in which mitigation which was used to assure environmental groups and to assure land managers that other environmental values, other than the oil resource, would be protected were not successful.

So, where are we? Basically Defenders of Wildlife oppose this bill both because it by its terms opens the arctic coastal plain for oil and gas exploration and development and because it attempts to say that this can be done in an environmentally sound manner.

And the decision is whether we are going to develop this oil and gas or not. If we do, then we are making an irrevocable change to this environment that we do not believe should be made. And we are trying to do so relying on very slim reason, indeed. Mitigation measures, as expressed in stipulations and conditions, simply cannot do the job in this environment. As we said before, there are questions of their enforceability. There are questions of their economics, and there are questions of their effectiveness.

And for those reasons, we would urge the committee to disapprove of this bill and consider instead placing the entire arctic coastal plain into wilderness status because only when this area is wilderness will it receive the protection that it deserves. We are talking about the very last place on this planet and potentially in this universe where this ecosystem exists and these wildlife species exist and where development has not yet occurred. And we would hope that that would be the focus of the debate and not how do we reduce the body count because that is what will happen if this bill goes forward.

Thank you.

[The prepared statement of Ms. Sheldon follows:]

Defenders
OF WILDLIFE

TESTIMONY OF KARIN SHELDON

CHAIR, BOARD OF DIRECTORS DEFENDERS OF WILDLIFE

BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

CONCERNING S. 1217, THE ARCTIC COASTAL PLAIN

PUBLIC LANDS LEASING ACT

October 15, 1987

Mr. Chairman, Members of the Committee:

Thank you for the opportunity to appear before you today to present the views of Defenders of Wildlife concerning Senator Murkowski's bill, S. 1217, which would amend the Mineral Leasing Act of 1920 to authorize the leasing of lands in the Arctic Coastal Plain for oil and gas exploration, development and production.

I am Karin Sheldon, Chair of the Board of Directors of Defenders of Wildlife. I am also staff attorney with the Rocky Mountain Office of the Sierra Club Legal Defense Fund. In that capacity I represent the Sierra Club, The Wilderness Society and other environmental groups in litigation concerning the public lands of the United States. Much of my practice involves efforts to protect these lands and their wildlife resources from the impacts of oil and gas exploration and development.

Defenders of Wildlife is a national, non-profit citizens' organization dedicated to protecting and conserving this country's rich abundance and diversity of wildlife and wildlife habitat. Founded in 1947, Defenders and its 80,000 members have consistently worked, through education and advocacy, to protect wildlife species and the environment in which they live.

It is the position of Defenders that oil development in the Arctic Coastal Plain of the Arctic National Wildlife Refuge, as proposed by Senator Murkowski's bill, will result in the loss of the area's wilderness character and in the drastic and permanent destruction of a unique natural ecosystem. It is Defenders' view that the wildlife and habitat value of the Coastal Plain can only be saved by designating the entire area as wilderness.

As the Department of the Interior recognizes, full-scale development, as called for in this bill, would destroy the wilderness value of the 1.5 million-acre Coastal Plain. The Department's Legislative Environmental Impact Statement (LEIS), a report to Congress, required by Section 1002 of the Alaska National Interest Lands Conservation Act of 1980 states "The wilderness value of the Coastal Plain of the Arctic Refuge (the "1002" area) would be eliminated, except for the area of the refuge east of the 1002 boundary between the Aichilik River and the Canadian border which is designated wilderness."

It is critical that members of Congress recognize the decision they are being asked to make in considering this legislation. If passed and implemented, the Arctic Coastal Plain Public Lands Leasing Act will permanently and irrevocably change the Arctic Coastal Plain from a splendid, wild and untrammeled place, perhaps the very last one of its size and quality on earth, to an industrial complex of gigantic proportions. We oppose it for this reason. We also oppose the bill because it attempts to obscure the consequences of its enactment with language of environmental concern. It is not possible to develop "giant and super giant oil fields" in an environment as fragile, complex and priceless as the Arctic Coastal Plain without irreversible damage. Such damage is inevitable. It goes with the nature of the activities involved in oil and gas exploration and development, and with the characteristics of the environment in which the exploration and development takes place.

This is a tough message to deliver, and an even tougher burden for Congressional decisionmakers. In our opinion, however, it is vital that the decision be faced squarely, and that the consequences of the choice to support this bill be realized. It will not be possible to develop oil in the Arctic Coastal Plain and preserve the environment which exists there at present. Whatever is done to provide for "environmentally sound" development will be minimal compared to the overwhelming and permanent loss. For Defenders of Wildlife that is an unacceptable result.

Before I address particular aspects of the Murkowski bill, I would like to describe briefly some of the wildlife resources of the Coastal Plain.

A. WILDLIFE

The casual follower of the Arctic debate may assume that the Arctic Coastal Plain is barren tundra, home only to the Porcupine Caribou Herd, and only for their brief calving season in the spring. In fact, the Coastal Plain supports an amazing array of animal and plant life. In order to fully appreciate the impact of development on the area, it is important to know more about its wildlife.

The list of birds found on the Coastal Plain would impress any ornithologist. Biologists have identified 135 bird species in the area. Half a dozen species of duck, and eighteen species of shorebirds breed in the area, with more than 2 million shorebirds inhabiting the Plain from mid-June to mid-July. Among the raptors are short-eared owls, golden eagles, rough-legged hawks and arctic peregrines, listed as threatened under the Endangered Species Act. During the late summer months the Coastal Plain hosts lesser snow geese. They arrive in numbers exceeding 300,000 and feed in Refuge wetlands for as long as 20 hours in preparation for their fall migration to California, Colorado, New Mexico and Mexico.

An oil spill would damage the birdlife found on the Plain. According to the LEIS, "Any spill of oil or other hazardous material along the coast could negatively affect coastal and marine habitats and fish and wildlife. Sea ducks, such as oldsquaw which heavily use this coastal area, could be displaced, and direct mortality could occur." The report goes on to state "Oil and other contaminant spills could kill waterfowl, particularly in lagoons where waterfowl congregate in large numbers. The effect on 1002 area populations could be major if a spill occurred in lagoons during peak molting, staging or migration periods."

The experience at Prudhoe Bay is that oil spills, and spills of other toxic materials, are inevitable. In recent years there have been 400-600 reported spills annually associated with oil development in the North Slope and the northern part of the haul road. An even greater number of spills occurred in the mid-1970's during construction. (Testimony of Robert Adler, Executive Director of Trustees for Alaska, to Subcommittee on Fisheries, Wildlife Conservation and the Environment of the House Merchant Marine and Fisheries Committee, July 30, 1987.) The LEIS notes that in 1985 alone more than 82,000 gallons of oil were spilled at Prudhoe Bay.

Polar bears, one of the few large mammals on the Coastal Plain, establish dens and give birth on land off the Beaufort Sea coast. The polar bear is very sensitive to human disturbance. According to the LEIS, "pipelines and roadways may prevent female polar bears from moving to and from inland denning areas. Production activities could create disturbances that would likely keep bears from returning to those preferred denning areas."

Muskoxen were reintroduced to the Arctic Refuge in 1969 and 1970, and remain on the plain all year round. The LEIS states that nearly three-fourths of the favored muskoxen calving area could be taken by oil production activities, resulting in "major negative effects" on the species.

The Coastal Plain of the Refuge provides essential habitat for many species of wildlife for all or part of their life cycle. According to the LEIS

> Most of the major wildlife species occurring on the refuge (caribou, moose, brown bears, wolverines, wolves, muskoxen, polar bears, and numerous species of birds) use 1002 area habitats for all or part of their life cycles (calving, nesting, breeding, staging). The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge.

The Department of the Interior concludes in the LEIS that "Oil and gas development will result in widespread, long-term changes in wildlife habitats, wilderness environment, and native community activities." Defenders believes that development of this fragile "American Serengeti" would have a devastating and irreversible effect on all wildlife and habitat found on the Coastal Plain.

B. EXPLORATION AND DEVELOPMENT

With this background in mind, I would like to look more closely at the proposed legislation. The legislation is described in the preamble as a bill to authorize the Secretary of the Interior to lease the Arctic Coastal Plain for oil and gas exploration and development in an "expeditious and environmentally sound manner." It is clear from the provisions of the statute that the emphasis is on development and not on protecting the environment. Indeed, the legislation makes environmental protection a secondary concern. While the Secretary of the Interior is empowered to "authorize and permit all such activities as are required to achieve the expeditious exploration, development and production of oil and gas resources," he need only achieve "reasonable protection of fish and wildlife resources" and, in his discretion, mitigate only "reasonably foreseeable significant adverse impacts on fish and wildlife and their habitats". The language of the bill does not direct the Secretary to prevent environmental damage, or to refrain from leasing because such damage will occur. Rather, the Secretary is authorized to mitigate, when he determines it necessary or appropriate to do so, major adverse environmental consequences through the use of stipulations and conditions in leases and unit agreements.

Our experience with conditions and stipulations in oil and gas leases in the lower 48 states gives us no confidence that these lease terms are an effective way to prevent, limit or ameliorate the environmental damage which results from oil and gas exploration and development activities. The lesson we have learned is that you cannot have it both ways. If irreparable damage is to be avoided in environmentally sensitive and important areas, the areas should not be leased for oil and gas.

Our lack of confidence in stipulations and conditions is based upon the oil industry's well known antipathy towards them, the Department of the Interior's reluctance to enforce them and the legal consequences when it does, and the fact that often they just don't work. Our three major concerns with stipulations and conditions are questions of: (1) Enforceability, (2) Economics and (3) Effectiveness.

(1) Enforceability

A central question in the use of stipulations to constrain oil and gas exploration and development activities to protect the environment is whether they are enforceable. This has two aspects - whether the Department of the Interior will require compliance with the stipulations as written, and whether a lessee is legally bound by stipulations if they impact the exercise of his lease rights in a significant way.

The oil industry's willingness to accept stipulations in leases in the lower 48 states reflects the fact that stipulations will generally be waived if it can be shown by the lessee to be too costly or difficult to exercise lease rights to explore for and develop oil and gas consistent with them. Most stipulations, including the No Surface Occupancy (NSO) Stipulation, which by its terms precludes any use or occupancy of the surface of the leasehold, are either explicitly conditional and may be changed upon a finding by the Forest Service or the Department of the Interior that the condition is not necessary or cannot be met. Stipulations are agreed to by lessees in order to get leases. They are waived or altered by local officers of land management agencies, without notice to the public, in order to allow exploration and development to proceed.

One example of the waiver process is currently ongoing in the Bridger-Teton National Forest in Wyoming. Amoco Oil Company has a lease which prohibits road construction across slopes with a grade of 40% or greater. Amoco has chosen a well site which cannot be reached without crossing slopes of greater than 40% grade. The company cannot comply with the stipulation and drill too. It has requested a waiver of the stipulation.

The Forest Service has asked that Amoco demonstrate that it can reclaim the slope which it proposes to cut as a pre-requisite to waiver of the stipulation. (The assumption underlying the stipulation is that slopes in excess of 40% generally cannot be reclaimed.) No decision has been reached, but the impasse is obvious, as well as the burden on both the company and the agency. The company has identified the drill site as the best location in the leasehold to drill. It has the right to explore for and develop oil and gas in the leasehold. The Forest Service is concerned about protection of surface resources.

Even if the waiver request is denied, the Forest Service and the Department of the Interior will be required to allow Amoco to drill somewhere on the lease, and to have access to the drill site. There is no stipulation for the whole of Amoco's lease which authorizes the Secretary of the Interior to deny drilling on the lease, notwithstanding the environmental effects which could result. Thus, regardless of the environmental consequences, it is likely that stipulations will have to be waived in order to permit Amoco to exercise its lease rights.

An equally troubling problem is the question of whether lease stipulations which a lessee claims interfere with exercise of lease rights, either by making their exercise more difficult or expensive, or by prohibiting some activity altogether, are enforceable at all. Numerous decisions of the Interior Board of Land Appeals have held that stipulations may restrict or control the timing, method and manner of exploration and development activities only as long as they do not impair the underlying rights of the lessee to explore for and develop oil and gas within his leasehold. The IBLA has ruled that impairment of lease rights is an unconstitutional taking of property.

The issue of enforceability of stipulations continues to be raised in litigation, with mixed results. Judge Kerr in Wyoming is of the view that stipulations which interfere with the basic rights to explore for and develop oil and gas render a lease a "shell" and constitute an unconstitutional taking of property. Rocky Mountain Oil and Gas Assoc. v. Andrus , 500 F.Supp. 1335 (D. Wyo. 1980), rev'd 696 F.2d 734 (10th Cir. 1983). Judge Robinson of the District of Columbia District Court has a different perspective. He has found that an oil and gas lease is a contract, and that a lessee may knowingly agree to any terms, even those which would make exploration and development impossible. Sierra Club v. Peterson, 17 ERC 1449 (D.D.C. 1982), rev'd in part on other grounds, 717 F.2d 1409 (D.C. Cir. 1983). We agree with Judge Robinson, but his is not a universally held view. Thus we gamble with precious resources when we rely on stipulations to protect them from damage. The more important and sensitive the resource, the more stringent the stipulation required to protect it, and unfortunately, the more problematic that the stipulation will be enforceable to achieve that goal.

Our concerns are not baseless. The oil industry is opposed to restrictive stipulations and frequently seeks to have these burdens removed from oil and gas leases. In March of 1987, for example, the Alaska Oil and Gas Association (AOGA) requested the State of Alaska to consider elimination of a variety of stipulations imposed by the State on state oil and gas leases in the North Slope. The stipulations, regarded by AOGA as "of questionable validity", "onerous" and "causing operators to incur excessive costs" included seasonal drilling requirements, restrictions on the dumping of drilling mud and cuttings, requirements for the removal of facilities at drilling sites and rehabilitation of those sites, and provisions for pipeline construction to allow safe passage for caribou. March 1987 _Report of the Lands and Exploration Committees of the Alaska Oil and Gas Association_ accompanying April 3, 1987 letter from William W. Hopkins, Executive Director of AOGA to Robert Grogan, Associate Director, Division of Governmental Coordination, State of Alaska. These are precisely the types of stipulations which the Department of the Interior would be expected to recommend for inclusion in leases for the Arctic Coastal Plain.

The competitive nature of the lease sales called for by the Murkowski bill creates some additional problems for the enforceability of stipulations. A lessee who has bid successfully for a lease sale has a great deal more invested in the opportunity to explore and develop his lease than does a non-competitive lessee who makes virtually no investment in the acquisition of a lease. A competitive lessee is likely to be much less willing to accept and comply with stipulations which will impact that investment in a significant way.

(2) Economics

This leads to our second concern about relying on stipulations and conditions to protect the environment and provide for ecologically sound mineral development. The Department of the Interior's Legislative Environmental Impact Statement includes suggested mitigation measures to ameliorate the impacts expected to result from leasing the Arctic Coastal Plain. Many, if not most of these measures, will be translated into lease conditions and stipulations, or conditions imposed in unit agreements. The LEIS does not analyze the potential costs of these suggested mitigation measures, costs which could have a dramatic impact on the willingness of the lessees to accept them, and on their enforceability and the economics of exploring for and developing oil in this extremely sensitive environment. The LEIS includes no data to demonstrate that any of the mitigation measures suggested is cost effective or makes any economic sense. This is an appalling omission, given the dependence upon mitigation to justify leasing activities and the current depressed condition of the oil market.

The fundamental issue of whether it is economic to attempt "environmentally sound" exploration and development in the Arctic Coastal Plain has not been addressed by the LEIS or the Murkowski legislation, much less answered by either. We see no basis for any assumptions that mitigation of the environmental damage resulting from oil development in the Arctic Coastal Plain is an affordable prospect. The environmental costs will likely be too high. In the face of the values to be lost, the choice is not to undertake the leasing program at all.

Data on the costs of some mitigation measures are available, and support our conclusions that these costs may make production in the Arctic Coastal Plain subject to stipulations and conditions uneconomic. The March 1987 AOGA Report discussed earlier includes an analysis of the costs which an operator on the North Slope can "reasonably [be] expected to incur" to comply with a number of stipulations. Some examples:

> (a) seasonal drilling requirement in the Beaufort Sea-long term rig shut down - $4,000-$20,000 per day; rig on operational standby - $60,000-$150,000 per day. (Report, p. 1)
>
> (b) prohibition on dumping of drilling mud and cuttings - $100,000-$1,000,000 per well. (Report, p. 1)
>
> (c) removal of drilling sites and facilities and rehabilitation - 1.5 to 2 times the cost of original construction. Current costs for construction of an on-shore drilling facility - $4-$11 million. (Report, p. 2)
>
> (d) pipelines construction to allow safe passage of caribou - $300,000. (Report, p. 2)

AOGA warned that these staggering figures may make it extremely difficult to justify exploration economically. In reviewing whether it is wise to support the Murkowski bill, members of Congress must ask themselves whether the contemplated oil development is economically sensible, and what will give - wildlife, wilderness character, environmental protection or oil development - when mitigation is found to be too expensive to achieve.

(3) Effectiveness

Finally, there is the question of the effectiveness of stipulations and conditions to do what they are supposed to do. If all your environmental eggs are in one basket - it had better be a pretty strong basket. Once again, our experience indicates it may not be. Mitigation measures do not always work.

Mitigation of environmental effects, particularly impacts on wildlife, is possible only when there is alternative high quality habitat available for wildlife relocation in the proximity of the area of disturbance, when the physical environment and the economics permit successful rehabilitation and restoration of pre-development conditions, and when damaging or disruptive activities can be halted or their timing changed to prevent conflicts. Mitigation of wilderness impacts is much more difficult because it is so terribly hard to reproduce or replace the character and characteristics of wilderness. Mitigation of ecosystem damage is likely little more than a Band-Aid on the biggest wounds.

The LEIS does not tell us whether and how any of the suggested mitigation measures will work in the environment of the Arctic Coastal Plain. Effectiveness is no more than a hope.

We are cautious about relying on hopes. For example, in the Bridger-Teton National Forest, the Forest Service relied on road closures to make alternative habitat available for grizzly bears, in order to allow timber sales and other activities in occupied grizzly habitat. The Forest Service was forced to acknowledge in a recent draft environmental impact statement on an oil well proposal that the road closures had not been effective in making the habitat available to bears. Sohare Creek Unit, Exploratory Oil Well No. 1-35, DEIS, U.S. Department of the Interior and U.S. Forest Service.

C. NEED FOR DEVELOPMENT

The Murkowski bill emphasizes that prompt development of the oil reserves of the Arctic Coastal Plain is desperately needed to assure American energy independence and meet consumer demand.

I live in Colorado and work in Denver. The offices of the Sierra Club Legal Defense Fund are in a building which used to be full of energy companies. The building is now virtually empty, as are many others in the city. Denver is in an economic slump because of the current stagnation of the oil market. The Department of the Interior continues to lease public lands in the West for oil and gas. 98% of all lands available for leasing in the Bridger-Teton National Forest are leased. In the six National Forests surrounding Yellowstone National park 83% of the available land is leased - almost 5 million acres - with 800,000 acres still open to leasing. Report of the Sierra Club "Paradise Leased: Oil and Our Public Lands", April 1987. Very little of this land is being explored or developed, again because of the market.

Defenders is cognizant of the importance of domestic oil production. However, to push for hasty development of unneeded and incredibly expensive oil at this time seems unreasonable indeed. If there is a vast quantity of oil under the Arctic Coastal Plain, it will remain in place should the time come that it is needed. In the meantime, we must not sacrific so magnificent and vulnerable an area in the name of energy independence.

D. CONCLUSION

This Committee, and the other members of Congress, must decide whether to protect the vast and varied environmental resources of the Arctic Coastal Plain or to allow oil and gas development to change it forever. Stipulations and conditions in leases cannot prevent the inevitable and significant damage which will occur. Mitigation may salve the conscience; it will not save the resources. On behalf of Defenders of Wildlife I urge you to reconsider this bill, and to replace it with one which will designate the Arctic Coastal Plain as Wilderness.

Thank you.

Senator BINGAMAN [presiding]. Next, I gather Congressman Fisher, who is representing the Wilderness Society? Please go right ahead.

We will have some questions of the whole panel when you are all finished with your testimony, if that's okay.

STATEMENT OF HON. JOSEPH L. FISHER, FORMER U.S. CONGRESSMAN, ON BEHALF OF THE WILDERNESS SOCIETY

Mr. FISHER. I am representing the Wilderness Society here this morning as a member of its governing council.

While I was in the House of Representatives, I served with Senator Chafee as co-chairman of the Environmental and Energy Study Conference. I have lived and worked in Alaska for a number of years in former times, and have always taken a close interest in its both conservation and developmental problems.

As you well know, the coastal plain where the Arctic Refuge is is the last vestige of this kind of an ecosystem, this kind of an environment, that is still fully protected. The remaining 90 percent of the north slope of Alaska, as well as the entire off-shore area, is now open to oil and gas exploitation, let alone other parts of Alaska. That is the general perspective on it. This is a relatively small part of the total.

A decision on whether or not to open up the Arctic Refuge to petroleum exploitation prompts the following question. Will the refuge's potential production really make a significant contribution to our future energy supply? If it will, that's one thing. But if the chances are that it won't, it would seem prudent and sensible not to go there but to go other places to find additional supply.

A Department of the Interior report, 1987, on this region estimates that if oil is present, 3.2 billion barrels could be found. But there is only a 19 percent chance that any producible oil will be found. And allowing for this probability of success, the expected output from the refuge amounts to less than 1 percent of the projected United States imports of oil over the lifetime of the field.

And there are alternative places to look for oil. Except for the Arctic Refuge, the entire continental shelf of the north slope, as I have indicated, is open for oil exploration and development. And this includes the geological extensions of Prudhoe Bay.

At least 90 percent of all the areas considered favorable for oil and gas potential in Alaska are now open to the oil companies. A 1981 report by the Geological Survey identifies some 83 billion barrels of recoverable oil yet to be discovered in the United States on on-shore areas and a lot more off-shore. So, we are really talking about a tiny, tiny amount out of the total potential in the whole country.

I could go into some detail of any number of these alternative sources, but I expect you have been through that.

I would like to turn to the gains that can be made over and above those already achieved in conservation, which is another huge potential way beyond anything that could possibly be produced from the Arctic Refuge.

While the current gains from energy conservation measures have far exceeded optimistic predictions of the early 1970s, when Senator Wirth and I were hot on this subject, even more significant energy efficiency advances are well within reach. The Department of Energy recent report on energy security documents these potential future gains. "In many cases, today's most efficient energy systems offer at least twice as much improvement over what was being done in 1973," when the first so-called oil crisis struck. "The best technology that can be reasonably projected for the turn of the century invariably offers another substantial jump in getting the same jobs done. Industrial improvements in energy efficiency show ingenuity, flexibility, and adaptability to a remarkable degree." And the report goes on in that vein.

As an example of the tremendous volumes of energy that could be saved with incremental improvements of energy efficiency, consider the fuel efficiency standards of automobiles and light trucks. This administration recently rolled back new vehicle mileage standards from 27.5 to 26 miles per gallon. If the Congress mandated that the fleet average for all new household vehicles should be 27.5 miles per gallon starting in 1993, the energy savings over the 26 miles per gallon standard would total some 4.6 billion barrels over the lifetime of any oil production in the Arctic Refuge. Compare this with the 3.2 billion barrels expected to be produced from the refuge in the unlikely event that any oil at all is found in producible quantities. And of course, if the gallons per mile standard should be raised higher or go higher, much more could be saved.

Energy conservation savings, of course, are not limited only to the transportation sector. One finds them in electricity generation and industrial use and pretty much across the board. Well, the whole burden of this testimony is that before invading a wildlife refuge of unique characteristics of tremendous value to the whole society, there are many, many other places to turn that make a lot more sense economically and in every other way.

Well, to sum it up, the likelihood of finding a significant amount of economically producible oil in the Arctic Refuge is small. Furthermore, there are many, many better alternatives, and especially the adoption of additional conservation measures, which of course have no particular bearing or have no effect on pollution—air, water pollution, wildlife, game, anything like that. Obviously, this is the sensible way to turn.

Energy conservation is actually preferable even to finding another Prudhoe Bay. Reductions in energy demand do not pollute the environment, do not sacrifice outstanding wilderness values, wildlife, and by all odds would be a preferable way to go.

Thanks very much.

[The prepared statement of Mr. Fisher follows:]

THE WILDERNESS SOCIETY

STATEMENT OF THE HONORABLE JOSEPH L. FISHER, DISTINGUISHED PROFESSOR OF POLITICAL ECONOMY, GEORGE MASON UNIVERSITY, AND MEMBER OF THE GOVERNING COUNCIL, THE WILDERNESS SOCIETY, BEFORE THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE, ON THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE, OCTOBER 15, 1987

This committee is charged with helping to determine the fate of a diverse spectrum of Arctic ecosystems. This area represents the last fully protected natural resource of its kind in the United States. The primary issue is the weighing of the value of the Arctic Refuge as an energy production unit versus the merit of the region as a preserve for protecting its unparalleled wildlife and wilderness values.

The coastal plain area of the Arctic Refuge is the last vestige of the North Slope coastal plain protected from development. The remaining 90 percent of the North Slope of Alaska, as well as the entire offshore area, is now open to oil and gas exploitation. An estimated 200,000 caribou stream to the coastal plain every spring to give birth, creating a vast spectacle unmatched anywhere else in this country. Wandering herds of muskoxen, as well as grizzly and polar bears, wolves, multitudes of migrating waterfowl and other fauna help explain why the Department of Interior's 1002 Report termed the coastal

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plain "the most biologically productive part of the Arctic Refuge for wildlife and ... the center of wildlife activity on the Refuge."

In 1977, the U.S. Fish and Wildlife Service successfully opposed the routing of a gas pipeline across the Arctic National Wildlife Range stating that "such a crossing is clearly not compatible with the basic purpose of the Arctic Range... we do not believe that the long-term national interest would be served by committing this unique area to development for short-term benefits when its outstanding values for wildlife and wilderness would be forever lost. To protect our public trust and to exemplify our good conscience as concerned ecologists, we must object strongly to any development which would threaten the integrity of the Arctic National Wildlife Range ... such activity would destroy wilderness values and irretrievably disrupt many wildlife populations and their habitats ... and that the Arctic Range is the last unspoiled area of its kind in the entire Northern Hemisphere."

Given the magnitude and uniqueness of the wildlife and wilderness attributes of the Arctic Refuge, we must carefully examine the arguments for petroleum exploitation. This testimony focuses exclusively on the likely magnitude of oil production from the Arctic Refuge, alternative sources of supply, and energy conservation.

Much of the rationale used to justify oil production in the Arctic Refuge is based on so-called energy security considerations. According to drilling proponents, a strategy of importing oil that is cheaper than domestic petroleum is harmful to national energy security. Apparently the United States will be more secure if this nation drills and produces domestic oil regardless of where it is found or how much it costs, in preference to conserving our remaining sources for a future time when they may be sorely needed.

Not all oil producers share this short-sighted view of energy security. T. Boone Pickens, the chairman of Mesa Petroleum Company, has said, "I just don't understand why we're rushing to drill our last remaining oil reserves in this country. At $18 a barrel, foreign oil is cheap. We should take all the oil the foreign producers have. Better to use and store foreign oil while the price is cheap and leave new Alaskan oil, if any, in the ground for when we really need it."

A decision on whether or not to open the Arctic National Wildlife Refuge to petroleum exploitation prompts the following question: Will the refuge's potential production make a significant contribution to our future energy security? The Department of Interior's 1987 report on the region estimates that if oil is present, 3.2 billion barrels could be found, but there is only a 19 percent chance that any producible oil will be discovered. Allowing for this probability of success, the expected output from the refuge amounts to less than one percent of projected U.S. imports of oil over the lifetime of the field.

The oil industry has compared the Arctic Wildlife Refuge with Prudhoe Bay. Initial total producible reserves from Prudhoe Bay amounted to approximately 9.5 billion barrels. Again inferring from the Interior Department report and allowing for the risk of dry holes, there is only about one chance in 100 that as much producible oil will be found in the refuge as at Prudhoe Bay.

Instead of comparing the Arctic National Wildlife Refuge to Prudhoe Bay, we should compare it to the National Petroleum Reserve in Alaska (NPRA). In 1979, the Department of Interior issued a petroleum assessment report for NPRA, located just west of Prudhoe Bay. According to the 1979 report, there was a 97 percent chance that NPRA contained producible amounts of oil. In fact, the expected production of oil, including the risk of dry holes, was three times greater for NPRA than the amount now expected from the Arctic Refuge.

At least 65 holes have been drilled in NPRA and more than $50 million, most of it federal government money, has been invested in the Petroleum Reserve, but no producible oil has been found. In fact, the results of exploration in NPRA are so disappointing that no oil companies bid on the latest lease sales for the most promising areas remaining to be drilled. As noted earlier, there is at least an 81 percent chance that this is the scenario that will be repeated in the Arctic Wildlife Refuge.

There are alternative places to look for oil. The entire continental shelf of the North Slope of Alaska is open to oil exploration and development, including the geological extensions of Prudhoe Bay. At least 90 percent of all of the areas considered favorable for oil and gas potential in Alaska are now open to the oil companies. In a 1981 report, the U.S. Geological Survey identified 83 billion barrels of recoverable oil yet to be discovered in U.S. onshore areas. And the Minerals Management Service of the Department of Interior projects future discoveries of over 12 billion barrels of oil reserves in offshore areas of the U.S.

The Department of Energy has identified 300 billion barrels of oil known to lie in and around currently producing U.S. oil fields which cannot be produced with today's recovery technologies. This figure represents over ten times our current level of oil reserves. Even a small improvement in recovery techniques, when applied to this massive resource, could yield many billions of barrels of oil in fields that are already known and are currently producing.

Other possible sources of petroleum are the West Sak and Ugnu Fields that lie literally on top of the currently producing Kuparak Field on the North Slope of Alaska. According to a study by Lewin and Associates in 1984, a total of 8.2 billion barrels of heavy oil is projected from the West Sak and Ugnu Fields at an oil price of $45 per barrel. Together these two fields are said to contain as much as 40 billion barrels of in-place resource. Testimony given by James Eason, a petroleum geologist, before the House Subcommittee on Water and Power Resources, indicates that "oil prices in the mid $20 per barrel range would go a long way toward making the West Sak commercial."

The most sensible solution to our energy supply problem is a conservation strategy that reduces energy demand. A barrel of oil not produced does not pollute the air or the water. It means that we do not need to drill in wildlife refuges or other special areas. And in cases such as improved automobile fuel efficiency standards, the fuel savings occur year after year with no additional investment.

Instead of encouraging energy efficiency and conservation, the Reagan Administration has taken the exact opposite approach. Contrary to market signals, the administration has cut the rate at which the Strategic Petroleum Reserve is being filled and advocates drilling in the Arctic Refuge. In addition to encouraging this "drain America first" philosophy, the administration has cut federal spending on solar energy and other renewable energy sources by over 80 percent. The administration's FY88 budget for energy conservation is only 10 percent of the FY81 appropriation.

Why has the current leadership reduced spending and largely abandoned energy conservation as an important component of our energy future? In 1985, the Department of Energy stated that energy conservation "has proven to be the most expeditious way to reduce the need for new or imported energy resources; and in fact it now contributes more to balancing our national energy ledger than does any single fuel source." Yet just five months ago when the Deputy Secretary of Energy was asked by the Senate Energy and Resources Committee about the administration's ideas on conservation and renewable energy he stated the administration has "no specific proposals to help those sectors at this time."

While the current gains from energy conservation measures have far exceeded the most optimistic predictions of the early 1970s, even more significant energy efficiency advances are well within reach. The Department of Energy report on energy security, issued earlier this year, documents these potential future gains. "In many casos, today's most efficient energy systems offer at least twice as much improvement over what was being done in 1973 ... The best technology that can reasonably be projected for the turn of the century invariably offers another substantial jump in getting the same jobs done. Industrial improvements in energy efficiency show ingenuity, flexibility, and adaptability to a remarkable degree."

As an example of the tremendous volumes of energy that could be saved with incremental improvements of energy efficiency, consider the fuel efficiency standards of automobiles and light trucks. This administration recently rolled back new vehicle mileage standards from 27.5 to 26 miles per gallon. If Congress mandated that the fleet average for all new household vehicles should be 27.5 miles per gallon starting with 1993 models, the energy savings over the 26-miles-per-gallon standard would total 4.6 billion barrels over the lifetime of any oil production in the Arctic Refuge (approximately 2000 to 2030). Compare this amount with the 3.2 billion barrels expected to be produced from the refuge in the unlikely event that oil is found.

However, current technology in vehicle fuel efficiency extends far beyond this modest 27.5-mile-per-gallon average. A 30-mile-per-gallon standard, also applied over a potential Arctic Refuge production lifetime, saves 11.4 billion barrels. And a 40 mile-per-gallon level yields a savings of 30.5 billion barrels — almost ten times the oil that might be found in the refuge. Indeed, the limits of today's technology, 60 miles per gallon, translates to an energy gain of 50.5 billion barrels of oil — over 20 billion barrels greater than the current oil reserves of the United States.

Energy conservation savings are not just limited to the transportation sector. The Department of Energy reports that currently known technology can be applied to fossil-fired electricity generation to increase efficiency by 20 percent, and that it is likely another 10 percent increase in energy efficiency would be possible by 2000. Applying these efficiency improvements to current electricity generation shows that a savings of almost 37 billion barrels of oil equivalent is possible between now and 2030. This amount of oil is 11.5 times the mean estimate of oil from the Arctic Refuge, again, if producible petroleum lies in the area.

The likelihood of finding a significant amount of economically producible oil in the Arctic National Wildlife Refuge is small. Furthermore, there are many better alternatives — especially the adoption of conservation measures that can be exploited with no increase in our energy security risk. Energy conservation is actually preferable to finding another Prudhoe Bay--reductions in energy demand do not pollute the environment, and do not sacrifice the outstanding wildlife and wilderness values of special lands such as the Arctic National Wildlife Refuge.

Senator **Bingaman**. Thank you very much.

Next, Lisa Speer, who is the Senior Project Scientist with the Natural Resources Defense Council.

STATEMENT OF LISA SPEER, SENIOR PROJECT SCIENTIST, NATURAL RESOURCES DEFENSE COUNCIL

Ms. **Speer**. Thank you very much. Mr. Chairman, members of the committee, good morning.

My name is Lisa Speer. I am Senior Project Scientist with the Natural Resources Defense Council.

Today I am testifying on behalf of NRDC; Trustees for Alaska, which is an Anchorage based conservation organization; and the National Wildlife Federation, a conservation organization with 4.8 million members and supporters nationwide.

NRDC, Trustees and NWF have had a longstanding interest and involvement in oil and gas leasing issues in Alaska, and we welcome the opportunity to be here today to testify on S. 1217 which would open the coastal plain of the Arctic National Wildlife Refuge to oil development.

NRDC, Trustees and NWF oppose this legislation. Our position is based in part on the results of a study we have jointly undertaken to examine three major issues: first, the environmental consequences of oil and gas development in the Arctic; second, the ability of existing environmental laws and regulations to adequately protect the arctic environment; and third, the industry's record of compliance with environmental laws and regulations.

Our study, which will be distributed to you and other Members of Congress when it is completed, revealed a number of issues which we feel bear on your consideration of S. 1217. Specifically we found first that hundreds of violations of State and Federal regulatory controls, designed to protect the environment on the north slope have occurred. These violations range from minor infractions to at least one instance of criminal activity. Together these violations represent a disturbing record of noncompliance on the north slope.

Second, existing laws and regulations, as they are currently implemented and enforced, have not provided adequate protection from environmental deterioration resulting from oil and gas development.

Third, industrialization of the Prudhoe Bay region has resulted in a wide range of environmental impacts, including pollution of the air and water and the alteration of substantial amounts of wildlife habitat.

And finally, there are major gaps in data on environmental impacts and compliance due to severe limitations on monitoring. These gaps are unlikely to be fulfilled in the foreseeable future given present levels of monitoring activity.

Our written testimony chronicles in detail the problems that we have found in our study. I would like to turn now to some of the questions posed by the committee in the ANWR issues list which I received from the committee last night. I will focus on those questions that are relevant to our expertise. Most of these relate to the appropriate size, timing and location of leasing in the coastal plain and appropriate stipulations and mitigating measures that should be attached to those leases.

I would like to begin by emphasizing that NRDC and Trustees believe the entire coastal plain should be designated as wilderness. But even if we didn't believe that, we would still find it extremely difficult to make meaningful recommendations on the proper size, timing, and location of leasing in the Arctic Refuge. Given the current state of knowledge about the effects that oil development has had on the arctic environment.

For example, no comprehensive analysis of the cumulative impacts of development on-shore and off-shore in the Alaskan and Canadian Arctic has been done. It is, therefore, impossible to know whether stipulations or tract deletions could effectively mitigate those impacts, and if so, what kind of stipulations would be appropriate.

As another example, no one has investigated the impacts of the large amounts of air pollutants, most notably NOx and SO_2 that are emitted on the north slope. The industry argues that because ambient concentrations of air pollutants are below national standards, that there is no cause for concern. However, according to the Alaska Department of Environmental Conservation, arctic species are known to be more sensitive to air pollutants than the mid-latitude species that were used to establish those standards.

Thus, simply because ambient standards are being met does not mean that no environmental damage is occurring. Indeed, EPA has voiced concern that acidification of the tundra may result even if ambient standards are being met. The Fish and Wildlife Service and DEC have raised similar concerns, but no studies have been conducted.

Until we know what effects these and other air pollutants are having on the tundra system, it is difficult to know what constitutes appropriate mitigating measures.

Similarly, millions of gallons of reserve pit fluids, which often contain metals, hydrocarbons and other contaminants, are discharged directly to the tundra each year. Questions about the effects of these contaminants on the ecology of the north slope have taken on an added urgency in light of a recently completed U.S. Fish and Wildlife Service study which found that elevated levels of pollutants are associated with reduced biological diversity and abundance in affected tundra ponds.

The industry has developed new techniques for handling reserve pit waste at Endicott and at Kuparuk, but no one knows whether they will be successful over the long term. In the absence of that knowledge, it is difficult to suggest appropriate mitigating measures.

These are just a few of the examples of the data gaps that make it hard to develop adequate mitigation. But even if adequate stipulations could be developed, one must ask what assurances will be given that the record of compliance with those stipulations will be any better than the industry's record of compliance with existing regulations at Prudhoe Bay.

Furthermore, even the best intentioned stipulations won't do much good if they are not properly monitored and enforced by the government. And what we have seen so far at Prudhoe Bay in this regard has been less than exemplary.

For example, EPA has elected not to issue NPDES permits for reserve pit discharges to tundra wetlands, a decision which we believe is not consistent with the Clean Water Act. The Corps of Engineers is not enforcing its requirements that reserve pits in tundra wetlands be impermeable. There are no PSD limits for NOx which is emitted in very large quantities on the north slope. And State limits on reserve pit discharges allow levels of pollutant discharges that exceed EPA's toxicity criteria for fresh water aquatic life.

In conclusion, we believe that two basic things need to happen before any informed decision regarding if, when, where and how to lease the Arctic Refuge should be made. First, there needs to be a much fuller understanding of the impacts that oil development has had at Prudhoe Bay, and I have mentioned a few of the data gaps that we believe need to be filled.

Second, the burden of proof lies with the industry and the resource agencies to show that new waste management and restoration techniques are effective and economically feasible over the long term. The burden of proof also lies with the industry to show that oil development can take place in compliance with the laws and regulations of the State of Alaska and of the United States. To date such proof has not been forthcoming.

Prudhoe Bay offers an excellent opportunity to see if the industry and the agencies can conduct oil development in the arctic in an environmentally sound manner. We recommend that they be required to do so before further consideration of opening the Arctic National Wildlife Refuge to oil development is undertaken.

Thank you for the opportunity to be here.

[The prepared statement of Ms. Speer follows:]

TESTIMONY
OF THE
NATURAL RESOURCES DEFENSE COUNCIL
TRUSTEES FOR ALASKA
AND
NATIONAL WILDLIFE FEDERATION

Before the

Committee on Energy and Natural Resources

United States Senate

on

S. 1217

October 15, 1987

Prepared by:

Lisa Speer, Senior Project Scientist
Natural Resources Defense Council

Robert W. Adler, Executive Director
Sue Libenson, Research Associate
Trustees for Alaska

Mr. Chairman and Members of this Committee: my name is Lisa Speer. I am Senior Project Scientist with the Natural Resources Defense Council (NRDC), a national environmental organization with approximately 70,000 members and supporters nationwide. I am testifying today on behalf of NRDC, Trustees for Alaska, an Anchorage-based public interest environmental law firm, and the National Wildlife Federation (NWF), a national conservation organization with 4.8 million members and supporters nationwide.

NRDC, Trustees and NWF have had a longstanding interest and involvement in oil and gas development in Alaska, and in issues related to the Arctic National Wildlife Refuge. We therefore welcome the opportunity to testify on S. 1217, which would authorize the Secretary of the Interior to lease the coastal plain of the Arctic National Wildlife Refuge for oil exploration, development and production.

NRDC, Trustees and NWF oppose this legislation. Our position is based in part on the results of a study we have jointly undertaken to examine three major issues:

1) the environmental consequences of oil and gas development in the arctic;

2) the ability of existing environmental laws and regulations to adequately protect the arctic environment from those impacts; and

3) the industry's record of compliance with environmental laws and regulations.

Our report focuses on onshore oil and gas development in the Prudhoe Bay region of Alaska[1] and is based on a review of the available literature, state and federal resource agency files, and interviews with regulatory agency staff. Copies of our report will be distributed to you and other Members of Congress when it is completed.

The major findings of the Trustees/NRDC/NWF report on Prudhoe Bay are:

1) Industrialization of the North Slope related to oil and gas development has resulted in a wide range of environmental impacts, including pollution of the air and water and the alteration of substantial amounts of habitat.

2) The conduct of the oil and gas related industries on the North Slope has ranged from environmentally responsible to irresponsible, and in some instances has involved a serious disregard for environmental impacts. Hundreds of violations of state and federal regulatory controls designed to protect the

environment have occurred. These range from minor infractions to at least one conviction on multiple criminal counts.

3) Existing environmental regulations as they are currently implemented and enforced have not provided adequate protection from significant environmental deterioration resulting from oil and gas activities.

4) The economic and technical feasibility of restoring large industrialized areas on the North Slope over the long term has not been demonstrated.

5) Major data gaps exist due to a systematic failure of the resource agencies to adequately monitor environmental impacts and compliance on the North Slope. These gaps seem unlikely to be filled in the foreseeable future given the current level of monitoring activity.

Based on these findings, we believe that major improvements in the way oil development is conducted in the arctic must be made before any further exploration and development takes place on the North Slope, and certainly before exploration and/or development, such as that contemplated in S.1217, is considered for the Arctic National Wildlife Refuge.

Highlighted below are the major issues of environmental concern identified in the Trustees/NRDC/NWF report. In considering these issues, it is important to keep in mind the fragility of the North Slope environment and its relative inability to accommodate disturbance. Arctic ecosystems are severely constrained by limited sunlight, extreme cold, limited precipitation, nutrient-poor soils and permafrost. The combined effects of these conditions result in low rates of plant growth, which excessively prolong recovery from disturbance.[2]

A. Water Pollution

1. Drilling wastes

Reserve pits are above-ground containment structures built on the tundra and used to store waste drilling muds, cuttings and other wastes.[3] These pits are constructed of gravel and may contain up to 13 million gallons of waste materials. Disposal of accumulated fluids in reserve pits is a major problem on the North Slope.

Analyses of drilling muds, reserve pit fluids and sediments generally reveal an array of toxic metals, hydrocarbons and additives in varying amounts.[4] Many of these are toxic to a variety of organisms.[5]

Reserve pit fluids regularly escape to the tundra and surface waters. Despite a number of regulations and permit stipulations requiring reserve pits to be impermeable, numerous leaking pits have been documented.[6] Waste fluids have also escaped due to overtopping or breaching of reserve pit walls.[7]

Fluids purposefully removed from reserve pits are pumped onto the tundra, spread on gravel roads, or injected underground under permits issued by the Alaska Department of Environmental Conservation (ADEC). In 1986, 64 million gallons of reserve pit wastewater were discharged directly to the tundra from reserve pits. In addition, 37 million gallons of reserve pit fluids were applied to roads on the North Slope.[8]

Studies by the U.S. Fish and Wildlife Service have found that tundra ponds associated with reserve pits exhibited elevated levels of toxic metals and hydrocarbons when compared to concentrations in control ponds.[9] Evidence that some of these contaminants are dispersing through tundra wetlands to distant ponds was found. Trends of elevated contaminant levels in tundra ponds near reserve pits and in hydrologically connected distant ponds were associated with general trends of declining diversity and abundance of invertebrate species that are important food sources for birds on the North Slope.[10]

Sediment concentrations of chromium and lead in ponds associated with reserve pits were found to be in the range of sediment metal concentrations typical of areas subject to heavy industrial pollution. Similarly, concentrations of total hydrocarbons in sediments in several ponds were consistent with levels observed in polluted coastal areas of the world.[11]

The regulatory controls on reserve pit discharges to the tundra and to roads appear inadequate to protect water quality and aquatic life on the North Slope for several reasons:

a. ADEC's general permits contain no effluent limits for a number of metals which, based on data developed by the industry, occur in reserve pit fluids at concentrations that exceed EPA's acute and/or chronic toxicity criteria for the protection of freshwater aquatic life.[12]

b. The effluent limits that are in place in ADEC's general permits allow levels of pollutant discharge that appear to exceed EPA's acute and chronic toxicity criteria for freshwater aquatic life for cadmium and copper and the chronic toxicity criteria for lead and mercury.[13]

c. The Federal Water Pollution Control Act (or Clean Water Act) of 1972 as amended in 1977 and 1987, forbids the discharge of pollutants into waters of the United States except when in compliance with a valid National Pollutant Discharge Elimination

System (NPDES) permit. EPA has elected not to issue NPDES permits for the discharge of reserve pit fluids into tundra ponds, claiming that issuance of such permits has been assigned a "low priority."[14] The fact that companies are discharging pollutants into tundra wetlands without valid NPDES permits is a situation we view with utmost concern.

d. According to discharge monitoring reports submitted by industry, discharges to the tundra from fully one half of the reserve pits dewatered violated effluent limits contained in ADEC's 1986 tundra discharge general permit. In 1985 and 1984, 85 percent and 100 percent of pits which discharged fluids violated permit standards.[15]

Given these problems, the question must be raised whether the system controlling water pollution on the North Slope is functioning effectively. We believe it is not.

2. Spills

In recent years there have been 400-600 reported oil spills per year associated with oil and gas development on the North Slope and northern portion of the haul road.[16] Diesel and crude oil, which are highly toxic to vegetation,[17] were the most commonly spilled products. Plant community stress due to oil spills is apparent at various locations on the North Slope, especially in the Deadhorse lease tract area where many oilfield service industries are located.[18]

3. Other sources of water pollution

Hundreds of permit exceedences for discharges of domestic wastewater, seawater treatment plant wastes and other wastewater are documented in Discharge Monitoring Reports required by EPA and ADEC. Cumulative impacts from wastewater discharges, which may include overenrichment of tundra ponds and eutrophication, have not been adequately assessed.

B. Air Pollution

Oil and gas facilities emit large amounts of air pollutants. For example, ADEC estimated of NO_x permitted to be emitted on the North Slope is greater than 90,000 tons, and that actual emissions are 70-90% of the permitted values[19] -- or 63,000-81,000 tons of NO_x. ARCO estimates that permitted NO_x emissions in the Prudhoe Bay region at 74,368 tons per year, with actual emissions "somewhat less" then those indicated.[20] By way of comparison, the Argonne National Lab estimates that Washington, D.C. emits approximately 23,000 tons of NO_x per year.[21]

The industry argues that although ambient concentrations of NO_x have doubled at Prudhoe Bay between 1980 and 1987, this is not a "significant change,"[22] and further implies that because ambient concentrations of air pollutants are below national standards, there is no environmental problem. While it is true that NO_x and SO_2 levels emitted by Prudhoe Bay facilities have not exceeded the NAAQS, arctic species are known to be more sensitive to air pollutants than are mid-latitude species which have been used to establish standards.[23] Moreover, ARCO's air quality monitoring data from Kuparuk indicates that average annual concentrations of NO_2 and SO_2 in 1986 -- the main precursors of acid deposition -- have increased as much as 3-10 fold in certain areas over levels reported by the industry in 1980.[24]

These pollutants are of concern due to their potential to acidify the sensitive arctic tundra. The industry argues that because only 618 tons of SO_2 are permitted to be emitted on the North Slope, acidification should not be of concern. However, NO_2 is also an acidifying pollutant, and SO_2 and NO_2 together have at least an additive effect, and usually more than additive effect.[25]

Moreover, EPA has raised concerns that acidification of tundra may result even if ambient air quality standards are being met.[26] The Alaska Department of Environmental Conservation has noted that negative impacts have been known to effect lichen at concentrations at least as low as 39 ug/m^3 and that short term concentrations are known to be more important to adverse effects than long term averages.[27] Maximum one hour SO_2 levels measured at the Kuparuk Field were 52 and 186 ug/m^3.[28] The U.S. Fish and Wildlife Service has also expressed concern about the short term and long term impacts of SO_2 on lichens, which are an important food source for North Slope caribou.[29] The effects of NO_x and other pollutants on plant species which serve as caribou forage are not known and there are no studies underway which evaluate potential effects.[30]

Industry has responded with claims that North Slope lichens are not affected by industrial air pollution, in part because the North Slope is a desert and all precipitation, including acid precipitation, is low. While the North Slope's annual precipitation is low and comparable to desert regions, acid precipitation is not the only process by which acidifying substances can be added to water or land. Dew, frost, frequent fogs and dry deposition through gravitational sedimentation of particles, impaction of aerosols, and adsorption of gases contribute to acidifying effects.[31]

A major problem with regard to air pollution regulation on the North Slope is that "prevention of significant deterioration" (PSD) increments have been established only for SO_2 and particulates. PSD increments have not been established for other air pollutants that are emitted in large amounts on the North Slope, most notably NO_x.[32]

C. Land and Habitat Impacts

Sixty million cubic yards of gravel have been used to construct facilities including over 300 miles of roads and 5,500 acres of gravel pads in the Prudhoe Bay area.[33] Pads and roads are used to support facilities such as drilling sites, housing, and other facilities. Open gravel mines cover approximately 720 acres.[34] An additional 3,400 acres of habitat have been flooded due to the impounding of roads and pads in one of the region's oilfields alone.[35]

The industry claims that only a small percentage of the land surface of arctic oilfields are affected by development. If one only counts land surfaces that have been directly covered by facilities, this is probably true. However, oilfield development sprawls over a large area, with facilities connected by roads, pipelines, and transmission lines. While a relatively small amount of the total area affected by oil development is actually covered, additional habitat is altered by oilfield activities, as is demonstrated by the avoidance of maternal groups of caribou of pipelines, roads and other facilities, particularly during calving. An Alaska Department of Fish and Game researcher has concluded that:

> even if the amount of direct habitat loss (i.e., vegetation covered by gravel were an order of magnitude larger it would be of minor significance when compared with the amount of habitat that would become unavailable because caribou avoid developments.[36]

Habitat within the oilfield may also be altered by flooding caused by impoundments associated with roads, dust which coats vegetation and changes snowmelt patterns, fragmentation of habitat, and human disturbance.

Several state and federal permits and leases provide for restoration of developed sites in the Prudhoe Bay region. However, relatively little rehabilitation has been done. While recent evidence indicates that several small sites have been the subject of revegetation and restoration efforts, no large scale, long term rehabilitation efforts have been attempted, much less demonstrated effectiva.

In addition, there is no assurance that monies have been set aside for what industry predicts will be astronomically high costs of restoration. For example, the Alaska Oil and Gas Association (AOGA) claims that removal of facilities constructed for exploratory drilling and rehabilitation of the site will cost 1.5 to 2 times the original construction cost.[37] Similarly, Chevron estimated that it would cost over $200,000 to close and revegetate just one reserve pit at its exploratory well on Kaktovik Inupiat Corporation lands within the Arctic National Wildlife Refuge.[38] There are hundreds of reserve pits in addition to hundreds of miles of roads and thousands of acres of gravel pads and open mine sites which may require restoration in the Prudhoe Bay region. Yet, the State only requires lessees to post bonds of $100,000 per lease or $500,000 statewide.

D. Hazardous and Solid Waste

Tremendous quantities of solid and hazardous waste are generated in conjunction with oil and gas development and production on the North Slope of Alaska. To date, the industry has not demonstrated affirmatively that it can dispose of these wastes in an environmentally acceptable manner.

Much of the waste material produced on the North Slope is the inevitable result of any major industrial undertaking of this magnitude. Solid waste generated by the oil industry includes wrecked vehicles, airplanes, used batteries, styrofoam pipeline insulation, tires, prefabricated scrap construction materials, large quantities of scrap metal, and over 10,000 used drums per year.[39] As an example, a three-year pipeline construction project can generate over 500 destroyed vehicles, 3,000 batteries, 10,000 tires, 20,000 tons of scrap construction materials, 6,000 tons of equipment components, thousands of used drums, thousands of cubic yards of various camp-related wastes, hundreds of prefabricated buildings, and large quantities of unused pipe.[40]

Perhaps more importantly, North Slope activities generate tremendous quantities of liquid industrial wastes, some of which are hazardous. A review of North Slope liquid wastes by ADEC documented the following volumes of wastes disposed of on the North Slope in 1986:[41]

Subsurface disposal

Injected wastes - ARCO Pad 3 - 3,649,422 gallons
CPF 1&2 disposal wells - 23,753,907 gallons
Annular injection - 116,006,142 gallons

Surface disposal

Reserve pit fluids to tundra	-	64,568,520 gallons
Road discharges	-	36,924,594 gallons
Excavation dewatering	-	369,500,000 gallons
Hydrostatic testing discharges	-	3,056,119 gallons
Domestic wastewater discharges	-	1,032,650 gallons
TOTAL		617,861,300 gallons

Many of these wastes have the potential to cause environmental degradation whether or not they are legally defined as hazardous. But the question of which North Slope wastes are hazardous is complicated by the fact that wastes uniquely associated with oil and gas exploration and development are currently exempt by law from classification as hazardous waste, whether or not the materials are in fact RCRA-hazardous. (RCRA §3001(b)(2)(A)).

Nevertheless, biennial hazardous waste generator reports on file at EPA indicate that large quantities of potentially hazardous waste are generated on the North Slope. Total volumes of wastes reported were 16,673,685 gallons in 1983 for all North Slope oilfields, and 166,669 gallons for the North Slope fields, not including ARCO Kuparuk, in 1985.[42]

There have been a number of hazardous waste violations on the North Slope. In 1983, a major hazardous waste event occurred at the site of North Slope Salvage, Inc. (NSSI), which stored and disposed of drums from North Slope operators.[43] During the cleanup, over 58,000 gallons of contaminated liquids were recovered. Extensive soil and water contamination was documented and the site was determined to pose a "serious environmental and human health hazard."[44]

Nor is this an isolated incident of improper storage and disposal of hazardous substances. Of 29 hazardous waste inspections by EPA and DEC, 11 revealed violations.[45] ADEC has closed two unpermitted oily waste pits with histories of leaking and overtopping fluids.[46] Most recently, ADEC has discovered additional problems on Deadhorse lease tracts. For example, ADEC discovered more than 500 drums of unidentified petroleum liquids and several tons of other waste on a pad leased to Child's Equipment Services, which has filed for protection from creditors in U.S. Bankruptcy Court. Some of the drums were leaking.[47]

Notably, no assurances have been given that this violation history will improve in the Prudhoe Bay region, or that such violations will not be repeated in the Arctic National Wildlife Refuge.

In fact, rather than giving assurances that this disturbing record of compliance will be corrected, the industry has continued to press for less stringent environmental protections on the North Slope. For example, in a letter written to the Alaska Office of Management and Budget in April of this year, the Alaska Oil and Gas Association attacked many of the regulations designed to protect the North Slope environment.[48] This hardly provides reasonable assurance that the industry is willing to improve its environmental compliance efforts on the North Slope.

Even if problem contractors like NSSI and Child's are brought under tighter control, the industry will continue to generate significant quantities of hazardous and other liquid wastes on the North Slope, and will generate additional wastes if they are allowed to operate in the Arctic National Wildlife Refuge. These wastes will continue to be handled both by the major oil companies and by smaller, independent companies, whether or not support and production facilities are consolidated.

The overriding question is where and how these massive quantities of wastes will be disposed of if development is allowed in the refuge. The burden of proof is on the oil industry to demonstrate that it can permanently and successfully isolate these wastes from the fragile North Slope environment. To date, they have failed to make this showing. EPA is just beginning to review the industry's proposals for deep well injection of wastes, and there is no guarantee that this practice will be allowed.

In fact, there are serious potential problems with deep well injection of wastes. A study by NRDC of deep well injection of wastes around the country documents numerous cases in which underground injection wells have failed, resulting in extensive groundwater contamination.[49] Indeed, injection even of supposedly innocuous "brines" at oil and gas wells have resulted in significant problems; over one half of 32 oil and gas producing states reported groundwater contamination from underground brine disposal.[50] The Office of Technology Assessment agrees that underground injection poses a potential threat to groundwater, and identified 8 possible contamination pathways.[51]

Nor has the oil industry demonstrated how it will dispose of the large quantities of nonhazardous wastes generated by North Slope oil and gas operations, including oily wastes. In fact, five supposedly nonhazardous waste disposal sites have been the subject of "preliminary assessments" under the Superfund Program.[52] The industry disclaims the importance of this by noting that none of these sites have actually been listed on the National Priority List (NPL) for Superfund cleanup. This claim is misleading, however; due to the slow pace of the Superfund process in Alaska, none of the five sites have proceeded to the more detailed Site Assessment phase, which is necessary to determine the extent of contamination at any given site. But the five sites have been chosen for further evaluation:

1. ARCO Prudhoe Bay received a "medium" priority assessment.[53] The site allegedly contains 10,000 - 80,000 buried drums, some containing drilling muds, and has received "a substantial volume of industrial (oil drilling-related) wastes."[54] The preliminary assessment recommends that "the risk to nearby water resources should be further evaluated."[55]

2. Mukluk Dump - Prudhoe Bay (medium priority assessment) may include "small quantities" of hazardous materials, including drilling muds, mud additives, some heavy metals, and solvents. The preliminary assessment refers to the potential for leaching to the Sagavanirktok River, and potential contamination of a human drinking water source.[56]

3. Mukluk Freight Lines (medium priority assessment) has been a storage site for a large number of industrial chemicals, and survey results indicated that some chemicals were leaking from drums or escaping from damaged and weathered sacks. The assessment also indicated that the site had insufficient structures for groundwater protection.[57]

4. North Slope Borough Landfill (medium priority assessment) accepts wastes from a large number of entities on the North Slope, and is currently the only operating landfill at Prudhoe Bay. The assessment refers to possible previous disposal of "oils, heavy metals and solvents," and recommends that the "risk to nearby water sources ... be further evaluated."[58]

5. Sand Dunes Landfill (medium priority assessment) also served as a major waste disposal site for North Slope oil and gas activities. Like the other landfills, this site may have received drilling muds, mud additives, heavy metals, solvents, and other hazardous materials. Previous EPA surveys mention potential leaching to the nearby river and possible contamination of potable water.[59]

These problems with sites that have been used for solid and liquid waste disposal in the past underscore the serious waste disposal problems that will be presented should oil and gas development be allowed in the Arctic National Wildlife Refuge. To date, neither the oil industry nor the Interior Department have presented a satisfactory plan for how these massive quantities of wastes will be handled in a national wildlife refuge, without posing a long-term contamination threat to the land and water resources of the refuge.

E. Implications for the ANWR Decision

The issue of whether a core calving ground exists within the Arctic National Wildlife Refuge, and the magnitude of impacts of oil and gas development on the Porcupine Caribou Herd, have consumed the vast majority of attention in this debate. Most people agree that there will be impacts on wildlife as a result of major oil and gas development in the coastal plain. Even the section 1002 report, which recommends full oil and gas leasing in the area, acknowledges that some of these impacts will be major. Only the precise magnitude of the impacts can seriously be debated.

While not wishing to minimize the critical importance of these issues, the NRDC/Trustees/NWF study, as well as critiques of the section 1002 report by CRS, EPA, and other entities, indicate that the chronic, long-range threats to the integrity of the Arctic National Wildlife Refuge include other far more subtle, less press-worthy, but equally serious issues. The following are a few of the fundamental questions we believe deserve attention by this Committee. Yet most of them were either not considered or received only cursory treatment in the section 1002 report.

1. How would the massive quantities of drilling and production wastes in the Arctic National Wildlife Refuge be handled? Even assuming that pollution of tundra wetlands and ponds that has been allowed in the Prudhoe Bay area is acceptable (an assertion we strongly disagree with), such impacts clearly are not consistent with the purposes of a National Wildlife Refuge.

2. What would be the long-range, chronic effects of NO_x and SO_x emissions on tundra vegetation and aquatic life within the coastal plain, and what would the effect be on lichen and other food sources for wildlife? What would be the effects of numerous, high visible black smoke incidents on the wilderness and other values of adjacent areas of the Arctic National Wildlife Refuge that have already been designated wilderness?

3. The Interior 1002 Report focused heavily on the "net" acreage of oil facilities, e.g. how many acres would actually be covered by roads, drilling pads, etc. They did not, as noted by CRS and other commenters, evaluate many of the secondary effects of these facilities, including indirect habitat modification via ponding, and behavioral impacts. Would habitat alteration in the coastal plain exceed what Interior predicts based solely on the physical number of acres actually affected?

4. Given the lack of substantial successful reclamation over the long-term of oil facilities at Prudhoe Bay, what assurance is there that the Arctic National Wildlife Refuge would

be restored to its natural state, or close thereto, when development is over? Given the paucity of bonding requirements, even if reclamation is technologically feasible, who would pay for such work if irresponsible operators abandon sites, as has occurred in the Prudhoe Bay region?

5. How would hazardous wastes be handled, transported and disposed of? ARCO and Standard Alaska have pending permit applications fir deep well injection of hazardous wastes at Prudhoe Bay. Would similar hazardous waste disposal permits be required for the Arctic National Wildlife Refuge, and is this appropriate for a National Wildlife Refuge? What are the likely long term problems associated with deep well injection in this region?

6. How and where would the massive quantities of other solid wastes be disposed in the coastal plain? A large number of landfills have been used at Prudhoe Bay, some of which are being considered for the Superfund program. Would the same be true in the Arctic National Wildlife Refuge?

F. Conclusion

Environmental impact and compliance issues discussed above are representative of problems associated with North Slope oil and gas development, but do not exhaustively portray all past and present problems. Due to the relatively limited regulatory presence and environmental monitoring devoted to the North Slope, records documenting noncompliance with environmental requirements as well as literature assessing impacts to environmental quality are limited. As a result, the full impact that the oil industry has had on this fragile area of the arctic is not clear.

What is clear is that much more study is required to gain a full understanding of the environmental consequences of oil development in the arctic. We believe such an understanding is essential to a wise decision on whether to open the Arctic Refuge to oil development, as contemplated in S. 1217. It is also clear that the implementation at the state and federal level of laws and regulations designed to protect the environment has been less than exemplary and that industry's record of compliance with those laws is mixed.

NRDC, Trustees and the National Wildlife Federation believe that substantial improvements in the way oil development is conducted in the arctic must be made before any further exploration and development on the North Slope takes place and certainly before exploration and/or development is even considered for the Arctic National Wildlife Refuge. The burden of proof lies with the industry and the responsible agencies to show that oil development can be conducted in an environmentally sound manner and in compliance with the laws and regulations of the State of Alaska and the United States. To date, such proof has not been forthcoming.

Thank you for the opportunity to testify.

1. Our report covers an area of the arctic coast of Alaska bordered by the Canning and Colville Rivers that has been the site of oil and gas exploration and development. This region includes a number of different oilfields, which are collectively referred to herein as the Prudhoe Bay oilfields or the North Slope oilfields.

2. The general fragility of tundra ecosystems is discussed at length in the following publications:
- Smith, R.L. 1980. Ecology and Field Biology. Harper & Row, Inc. New York, New York.
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co., Philadelphia.
- Bliss, L.C. 1970. Primary Productivity within Arctic Tundra Ecosystems. In: (eds.) Fuller, W.A. and P.G. Kevan. 1970. Proceedings of the Conference on Productivity and Conservation in Northern Circumpolar Lands, Edmonton, Alberta. IUCN Publications. Morges, Switzerland.

3. Drilling fluids or "muds" are used in large quantities in drilling operations to lubricate the drill bit and serve other functions. Each well generates about 18,000 barrels of waste muds and "cuttings," which are pieces of rock ground up by the drill bit that come out of the well coated with mud. Standard Oil Company, 1987. Arctic Oil and Gas Exploration and Production Waste.

4. See, e.g.:
- Standard Oil, 1987, supra.
- Duke, T.W. and P.R. Parrish, 1984. Results of the Drilling Fluids Research Program Sponsored by the Gulf Breeze Environmental Research Laboratory, 1976-1984, and Their Applications to Hazard Assessment. EPA/600/4-84-055.
- Woodward, D.F., R.G. Reilly, T.R. Garland, E. Snyder-Conn, 1987 in prep. Drilling Fluids and the Arctic Tundra of Alaska: Assessing Contamination of Wetlands Habitat and the Toxicity to Aquatic Invertebrates and Fish. U.S. Fish and Wildlife Service, National Fisheries Contaminant Research Center, Jackson, Wyoming.
- West, R.L. and E. Snyder-Conn, 1987 in press. The Effects of Prudhoe Bay Reserve Pit Fluids on the Water Quality and Macroinvertebrates of Arctic Tundra Ponds in Alaska. U.S. Fish and Wildlife Service, Fairbanks, Alaska.

5. See, e.g.,:

- U.S. Environmental Protection Agency, 1987 in prep. Waste from the Exploration, Development and Production of Crude Oil, Natural Gas, and Geothermal Energy, Interim Report. April 30, 1987.
- Strosher, M.T., W.E. Younkin and D.L. Johnson, 1980. Environmental Assessment of the Terrestrial Disposal of Waste Drilling Muds in Alberta: Chemistry of Sump Fluids and Effects on Vegetation and Soils. A Report prepared for the Canadian Petroleum Association, December, 1980.
- Land, Bernard, 1974. Toxicity of Drilling Fluids to Aquatic Biological Systems, A Literature Review. Environment Canada, Fisheries and Marine Service Report 487.
- U.S. Department of the Interior, 1987. Final Coastal Plain Resource Assessment, Arctic National Wildlife Refuge.

6. - ARCO, 1985. Report on the Releases of Hazardous Wastes or Constituents from Solid Waste Management Units at the Facility, Prudhoe Bay Unit Eastern Operating Area. November 8, 1985.
- Standard Oil, 1987, supra.
- ADEC, Problem Pit List, July, 1987.

7. ADEC, 1987(a). A Review of Liquid Waste Production and Disposal at Oilfield Facilities on the North Slope of Alaska.

8. Id.

9. West and Snyder-Conn, 1987, supra. See also, Woodward et al., 1987 in prep., supra.

10. West and Snyder-Conn, 1987, supra.

11. Woodward, et al., 1987, supra.

12. Metals analyses reported for four pit fluid samples by Standard Oil (1987, op. cit.), show aluminum concentrations exceeding EPA's acute and chronic toxicity criteria for freshwater aquatic life by as much as two orders of magnitude in all samples; zinc exceeding acute and chronic toxicity criteria in three of four samples and nickel exceeding the chronic toxicity criterion in one of four samples. Although ADEC has done no modeling of how dilution works in a wet tundra ecosystem, ADEC assumes for the purpose of setting permit limits that reserve pit fluids replaced water where they are discharged and that no dilution occurs.

13. EPA's acute and chronic toxicity criteria for freshwater aquatic life (assuming medium hardness (100 mg/l $CaCO_3$)),for cadmium and copper are 0.0039 and 0.0011 mg/l and 0.018 and 0.012 mg/l, respectively; ADEC's limits on both metals are 0.010 and 0.021 mg/l, respectively. EPA's chronic toxicity criteria for freshwater aquatic life for lead and mercury are 0.0032 and 0.000012 mg/l, respectively. ADEC's limits are 0.050 and 0.002 mg/l, respectively for lead and mercury.

14. EPA letter dated 8/11/86 in response to Conoco's NPDES permit application for reserve pit tundra discharge.

15. Discharge Monitoring Reports, 1984-1986.

16. ADEC, 1987(b). Data Summary for North Slope Spills 1985 and 1986, page 1.

17. U.S.Department of the Interior, 1987 op. cit.

18. ADEC, 1986(a). Environmental Information Relative to Air and Water Quality, Solid Waste Disposal and Oil Spill Contingencies for the Arctic National Wildlife Refuge.

19. ADEC, 1986(a), supra.

20. ARCO, 1987. Air Issues on the North Slope of Alaska. Standard Oil asserts that Prudhoe Bay facilities emit only 20,000 tons per year. Standard Oil, 1987, supra.

21. Argonne National Laboratory, 1984. Estimated Monthly Emissions of SO_2 and NO_2 for the 48 Contiguous States, 1975-1984.

22. Standard Oil, 1987, supra.

23. ADEC, 1986(b). Response to ARCO's Comments on the Preliminary Air Quality Analysis for Kuparuk CPF-3, April 1986.

24. In 1979-1980, ambient air monitoring was conducted to establish baseline data for the North Slope. Standard Oil, 1987 page 22. The following is a comparison of the annual average ambient concentration of NOx and SO2 measured as background for the North Slope in the 1979 and 1980 monitoring, and 1986 monitoring at the Kuparuk River "maximum impact" station.

	1979-1980	1986*	
		1st qtr	2nd qtr
NO_2 (annual average)	3.5**, 4.0**	11	19
SO_2 (annual average)	0.4**, 0.5**	3	5

From: ARCO, 1987, supra, pages 8-9.

* Includes monitoring data collected from June - December, 1986.
** Below the minimum detection limit of the analyzer.

25. EPA, 1982. Air Quality Criteria for Oxides of Nitrogen. EPA-600/8-82-026, page 1-31.

26. EPA, 1987. Letter from Robbie Russell, Regional Administrator, U.S. EPA Region X to the U.S. Department of the Interior, dated June 1, 1987.

27. ADEC, 1986(b), *supra*.

28. ARCO, 1987, *supra*., page 9.

29. U.S. Fish and Wildlife Service, 1986. Letter from Regional Director to Keith Kelton, ADEC. Letter # RS/6912/P.

30. ADEC, 1986(a) *supra*.

31. EPA, 1982, *supra*.

32. EPA is under a court order to issue PSD increments for NO_x by October, 1988. *Sierra Club v. California*, ND Cal, no. C-86-0971-WWS.

33. Shideler, Richard T., 1986. Impacts of Human Developments and Land Use on Caribou: A Literature Review, Vol. 2. Impacts of Oil and Gas Development on the Central Arctic Herd, Technical Report #86-3. Alaska Department of Fish and Game, Division of Habitat.

34. *Id.*

35. Walker, D.A., P.J. Webber, M.D. Walker, N.D. Lederer, R.H. Meehan and E.A. Nordstrand, 1986. Use of geobotanical maps and automated mapping techniques to examine cumulative impacts in the Prudhoe Bay oil fields, Alaska. *Environmental Conservation*, 13:149-160.

36. Shideler, 1986, *supra.*

37. Letter from AOGA dated 4/3/87 to the Alaska Office of Management and Budget.

38. Chevron, 1987. Kaktovik Inupiat Corporation (KIC) Well Reclamation Plan, 1987.

39. ADEC, 1987(c). Solid Waste Management Standards for Arctic and Subarctic Alaska, page 2.

40. ADEC, 1986(a) *supra*.

41. ADEC, 1987(a) _supra_.

42. The Kuparuk report could not be located in EPA's files.

43. ADEC, 1984. Report on the Occurrence, Discovery, and Cleanup of an Oil and Hazardous Substances Discharge at Lease Tract 57, Prudhoe Bay, Alaska.

44. Clar, J.M., 1984. An Evaluation of the Environmental and Human Health Hazards of Chemicals found at North Slope Salvage, Inc. (prepared for ADEC).

45. The results of most of these hazardous waste inspections are unavailable in the public record because they are pending review or compliance action.

46. The Pingut Oily Waste Pit and Drill Site 1C.

47. Anchorage Daily News, 7/19/87.

48. Letter dated 4/2/87 from the Alaska Oil and Gas Association to the Alaska Office of Management and Budget.

49. Gordon and Bloom, Deeper Problems: Limits to Underground Injection as a Hazardous Waste Disposal Method (NRDC, 1986).

50. Donald V. Feliciano, "Underground Injection of Wastes. Mini Brief Number MB83238," Congressional Research Service, Oct. 15, 1983, cited in Deeper Problems, _supra_.

51. Technologies and Management Strategies for Hazardous Waste Control, Office of Technology Assessment, U.S. Congress (1983), at 192, cited in Deeper Problems, _supra_.

52. Preliminary Assessment of 45 Potential Hazardous Waste Sites in the State of Alaska. Tetra Tech, Inc. 1984.

53. Four recommendation levels are possible in the Tetra Tech report:

None - no further action recommended
Low - inspection recommended on a time-available basis
Medium - inspection recommended on a scheduled basis
High - inspection recommended promptly.

54. _Id_.

55. _Id_.

56. _Id_.

57. Id. Standard claims that this site was incorrectly included in the preliminary assessments, and that an EPA official has recommended removal from the program. Standard Oil, 1987. Oil and Gas Development in the Arctic National Wildlife Refuge 1002 Area; Issues Raised by Environmental Groups During Testimony Before Congress, page 16.

58. Id.

59. Id.

Senator **Fowler**. Mr. Chairman—Chairman Wirth I should say—before I have to go to a budget matter, I want to just thank all the panel for being here, but especially my friend, Mr. Fisher, a former colleague on the Ways and Means Committee. I still miss the wake-ups of the Chairman when we offered Fisher-Fowler amendments. And glad to see you again.

Senator **Wirth** [presiding]. Thank you, Mr. Fowler.

Mr. Freeman.

STATEMENT OF DR. MILTON M.R. FREEMAN, HENRY MARSHALL TORY PROFESSOR, UNIVERSITY OF ALBERTA, EDMONTON, AB

Dr. **Freeman**. Thank you, Mr. Chairman.

My name is Milton Freeman. I am an ecologist and social scientist with 30 years' experience working on environment and development issues in the arctic regions. During this time I have served as an advisor to various native groups and to the territorial and federal governments having served in Ottawa as Senior Science Advisor to the federal Department of Indian and Northern Affairs, which is the lead department in matters of environmental management in the Canadian north.

Mr. Chairman, in my written brief I have addressed three particular situations that pertain to ANWR, the ANWR issue. And I will briefly go through these. First of all, the high cost of social breakdown and its relationship to subsistence activities on the north slope. I refer in my brief to the class of problems known as "no technical solution problems" where there is no particular quick fix once complex social systems break down.

Second, I refer to the importance, when weighing the experts' advice, of according very great weight to the expertise of rural Alaskans and Yukoners whose testimony you will have received, and you may still be receiving, during these hearings.

And parenthetically, Mr. Chairman, I would like to add that the opinions expressed from village representatives will not necessarily represent unanimous positions, and as Mr. Justice Thomas Berger has demonstrated, village hearings take a long time to effectively ascertain the true opinions held on problematic issues that can find family members on opposite sides of a controversy.

And third, the nature of development as the term has come to be defined. I speak to this issue and the importance of non-material attributes in evaluating development. It is not only economic value that we need consider, but importantly development involves quality of life issues and considerations of equity and social justice.

Now, however, what I want to do in a moment is to speak on one main issue in the time that I have before you. And it falls more to the issue of subsistence though touching on all of the points mentioned in my written testimony.

Though we identify the issue of subsistence more especially with northern native societies in the context of these particular hearings, in fact, we ourselves are not totally divorced in our industrial civilization from the concerns, and more especially the implications, of subsistence. In our case, given our occupational and social specializations, we leave the business of food producing to others, to the farmers, the fishermen, scientists and businessmen who insure we continue to have food on the table, and to the government agencies and environmental groups whose interactions aim to insure that the global environment can still provide the resources we will always need to stay alive.

In our case, however, our subsistence activities are highly attenuated, largely delegated to others. A native Alaskan and Yukon society remains the business of everyone, but we have this common bond, this shared dependency upon the environment to provide for our continued existence. And as most would agree, the environment needs all the help it can get to survive the onerous demands we so often recklessly impose upon it.

Our environmental problems mainly stem from an attitude problem, an indifference to the long-term effects of what we do. If we are to correct or offset this cultural shortcoming, we need to look with humility upon the subsistence behavior of others, those still possessing a profound ecological awareness of the fundamental relationships, biological, psychological and spiritual with which we are inextricably bound to living nature.

My brief speaks to the importance, which I cannot overly stress, that members of this committee listen and learn from the testimony which comes from the Alaskan and Canadian native users of the living resources of the north slope region. These are representatives of long-term civilizations that have an intimate and enduring dependency upon the true wealth of the tundra and the tiger, the renewable resources which have sustained their societies and cultures for centuries if not millennia. And unless our future recklessness interferes, these dependencies could continue to sustain the indigenous ways of knowing and doing that I submit to you are of essential importance to our own future well-being.

I come back again to my observation, Mr. Chairman, that our 20th Century industrial civilization has an attitude problem that is of such proportions that we must all be concerned about the world we will leave to our grandchildren. Two weeks ago at the Alaska Science Conference in Anchorage, two full days were given over to discuss long-term research in federally reserved lands in northwest Alaska. An overriding and recurring theme voiced by scientists and resource managers at this conference was how can we truly involve the native residents in our research. How can we tap their environmental knowledge and wisdom? How can we be assured their expertise will be joined in setting the research agendas now and in the future?

This is, indeed, a welcome realization now ever so widespread. Just last month in a speech to the Canadian House of Commons, the member of Parliament for the Yukon referred to a Canadian scientist who could name and classify 200 northern bird species. This scientist can neither read, write nor speak English, but rather works in the Looshoo Indian language and lives in Old Crow.

One of the hats I wear is as a member of the Commission of Ecology of IUCN, the International Union for the Conservation of Natural Resources. That commission made up of scientists from about 30 countries has as one of its main tasks the recording of environmental knowledge from the hundreds of traditional hunting, gathering, farming, fishing and pastoral societies around the world whose insights and accumulated wisdom for all our sakes must not be lost.

I will not labor the point further but merely observe that over the past five years there have been numerous international science conferences sponsored by such groups—and I will mention just a few for the record—as the Marine Sciences Division and the Ecological Sciences Division of UNESCO, the International Association of Biological Oceanographers, the International Union of Biological Sciences, the International Ecological Association, and here in Washington, the National Research Council. All these groups are concerned to insure indigenous knowledge systems be used in solving various environmental and scientific problems.

In short, Mr. Chairman, the realization exists widely and sincerely that subsistence users, having a special relationship with their environment, have important lessons we need to learn, to learn quickly and to learn well. It is for this reason among others that I am profoundly disturbed when threats to subsistence use are promoted ostensibly for the national good. We must insure our priorities are in order when we speak of the national interest. We must weigh very carefully the potential benefits and the potential losses, and we must use an appropriate calculus when making these particular judgments.

What price a few hundred thousand and or a few million barrels of oil? What price a human life, a way of life, and ultimately our way of life? The issues at stake, Mr. Chairman, override those of economics but not of morality and are not those of expediency but of sustainability.

Thank you very much.

[The prepared statement of Dr. Freeman follows:]

STATEMENT OF DR. MILTON M.R. FREEMAN, HENRY MARSHALL TORY PROFESSOR, UNIVERSITY OF ALBERTA, BEFORE THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE, 15 OCTOBER 1987

Mr. Chairman, Members of the Committee, I am Milton Freeman. In this testimony before you, I have chosen to be brief rather than discursive as the issues I choose to address are straightforward, and much of what I could report, second-hand as it were, will be heard by you first hand during the subsequent public testimony phase of these hearings.

Over the past fifteen years there have been many social impact assessments made in both the U.S. and Canada that bear on these present hearings, for the Northern regions of our continent have felt the quickened pact of industrial development, whether in the form of massive hydro-electric developments or proposals for mining, hydrocarbon or transportation developments. In nearly every case a coalition of groups, representing native residents of the region, environmentalists, church groups, academics and assorted other public interest bodies have counselled extreme caution, if not implacable opposition, to the proposed developments. Why should this be so and why does this continue to be so? Surely after so many earlier attempts to push the industrial frontier north, we must have learned something of how to do it right? The reason petitioners continue to urge caution is not because we have learned nothing, for certainly we have, but rather that the stakes are so high should the predicted negative impacts come to pass. You may ask, why -- if we have learned from our past experiences -- why are mistakes still made? The answer is simple: there are classes of problems in this world which have no technical solution. This is not to say there are no remedies to such problems but merely that there is no quick fix, no easily advanced or surefire solution. We can think of many such no-technical solution problems closer to home: unwanted pregnancy, urban violence, chronic youth employment, sexual and physical abuse of children -- the list goes on and on. There may be solutions, but they seem a long time in coming, and according to many official reports, despite our seemingly best attempts to resolve the problems they do not appear to become less common with each passing year.

The fact is that societies are not machines, in the sense that one can diagnose the cause of the problem, take remedial action and presto -- all works like clockwork once again. Human societies -- even those appearing most simple -- are the most complex, variable, and unpredictable of all ecological systems, and despite their inherent powers of overcoming internally and externally posed perturbations within a certain range, there are finite limits of stress whose thresholds can be exceeded often without too much advance warning.

It is for this particular reason, namely the high cost incurred in societal breakdown, the extreme difficulty of effecting social reconstruction following such breakdown, and the ensuing human casualties and losses whose presences and absences respectively persist long after the event, it is for these reasons that I spoke of the high risk involved. Scientists and technicians may speak reassuringly of the high degree of certainty their present environmental studies and the sophistication of their technology affords their predictions of control over the events developmental actions may precipitate. However, no true scientist can speak of absolute certainty, only of probabilistic outcomes, and these estimates as refined as they may be in many fields of laboratory science, are still woefully crude when applied predictively to ecological problems. And we must remember that the stochastic or random behavior of many natural events are even more random and unpredictable in the case of human behavior, of human societies' responses to change. This means, simply, that we cannot say how much stress can be tolerated before a society's ability to cope is exceeded, nor can we say how much of what kind of remediation will be required to restore society to its former state of well-being. In the case of small rural communities, we might reasonably conclude that the presumed cure would be a great deal worse than the malady, in terms of long-term intrusive impact. Given all this and the inherent uncertainty of outcome, public policy should presumably aim to sustain a society's own institutional capacity to endure change, rather than try to second guess its tolerance level with the fanciful expectation that any problem caused can be attended to after the fact. If such social and personal problems associated with stress in our own cultural and social milieu, prove difficult to remedy after the fact, it is a matter of record that they are that much more refractory in social and cultural settings that operate according to quite different and distinctive rules, values, and ideologies from those of the so-called helping professions.

What sort of societal dislocations am I speaking of here, and what sort of externally-mediated impacts could be experienced by residents of Alaskan and Canadian arctic and subarctic communities? The impacts will, I am sure be eloquently enumerated before you by mainly native American and Canadian residents of the region, as will be the anticipated consequences of these impacts. So I will be brief on these points here, but will merely mention the threatened loss of livelihood, of autonomy, of self-worth, of human dignity, that follows from damage to a way of life. Make no mistake, we are not merely speaking of loss of a total and preferred way of life, a loss that affects a person's psychic and spiritual, as well as their physical being. Such an assault on the human person, indeed on human rights, is not ordinarily expected within a tolerant, caring, democratic tradition, at least not today even though regrettably, in the past such happenings were common enough.

To some it is sufficient to invoke the "national interest" to justify the sacrifices the minority must make for the good of the common wealth. Alaskans have lived through many "boom and bust" cycles, as have Yukoners and residents of other frontier regions. The booms may be munificent -- for some -- but the busts are painful for many more people and for far longer periods of time. To encourage economic development that perpetuates the damaging boom and bust economy is hardly enlightened public policy. If the answer is: "We will moderate the boom's worst effects and spread the benefits as far as possible" then I say "welcome to dreamland". Under our present system of government, that just cannot be done. Mr. Justice Thomas Berger in his truly enlightened report on the Mackenzie Valley Gas Pipeline Inquiry a decade ago, observed that in order to mitigate the worst of the social impacts of the proposed pipeline the steps taken would need to be so authoritarian, so draconian, that no democratic government would undertake to impose them, no union would allow them, no free society could tolerate to that degree the infringement of its civil rights. Yet, the alternative, in its most unfettered, promised such an assured disruption of village life, such a litany of problems (including alcoholism and substance abuse, family disruption and violence, increasing accidents, illness and suicide, prostitution and loss of traditional family values and so on) that the good judge was forced to conclude, as the villagers had argued, that the costs of the development as proposed were just too great. It is important to observe that their willingness to forego the benefits of industrial boom, of high wages and employment opportunities, was made by individuals who needed cash incomes, who hoped to see jobs created in their villages to enable them to purchase such needed equipment as guns, boats, motors, snow machines, household appliances, and all the other consumer items people now depend upon. The warning about disruption to the assured supply of key subsistence resources came not just from social scientists who theorize in their warm and distant academic nooks, not from public-spirited and sometimes misguided urban-based romantics who think of life in rural Alaska or the Yukon in only the rosiest of terms.

In case I am mistakenly cast in the role of such a redundant outsider, let me explain my presence today in the following way. I am not here to anticipate or attempt to provide scholarly justification for the testimony you will be presented with next week, but rather to voice concern lest this subsequent evidence not be accorded appropriate weight when the decisions have to be made. The reason I say this is because though social scientists know so very little about the mechanics of social change and far less about how to predict outcomes in such changed situations, there are some things that now seem accepted. The first, which has direct bearing on this committee's responsibilities, is that if social change is directed from within a society (rather than from without) the ensuing adjustments are most likely to be accommodative to the needs of society, more likely to be effective and enduring than when imposed from without. The second relevant factor appears to relate to the pace of change in determining the nature of the outcome. In this case, given the many interrelated variables involved, the optimum pace of change is best gauged intuitively from within the society rather than be technical or other means from without. And finally, we now understand "development" to be not an event, but rather a process: it is a process that enriches, that strengthens, that empowers people to take control over their lives. To the extent that investment on the frontier immiserates, weakens, and strips people of their humanity, it cannot be considered development and it is to be deplored -- no matter how many others gain material riches from the enterprise. No massive industrial development with potential for great harm can surely be contemplated in this day and age, without every consideration being given to the environmental and social costs likely to be incurred. My conclusion, as a social scientist and ecologist is that the best information to be provided in your quest for a reasonable solution will come from the statements you will receive from northern residents, and not from academically-trained outsiders. When the so-called experts disagree among themselves -- as I'm sure they will continue to do -- the surest path to correct solution is the one with the strongest moral underpinning. The enduring spirituality of native Americans, which is so strongly manifest today, provides the respected members of this Committee and your congressional colleagues, with an assurance as to the correct path to follow. Discerning this path however, will require that you seriously involve the native residents of the region in your deliberations. This particular instance, the proposal to open the Arctic National Wildlife Refuge to industrial development provides an interesting test of the usefulness of the Bruntland report (on Environment and Development) and the newly-revised World Conservation Strategy, both of which enlightened reports I am certain the United States officially endorses. Bruntland speaks of sustainable development, and according to the World Conservation Strategy that is what conservation is all about. But both go further in that they link conservation inextricably with concerns about equity and social justice. Those who expect the United States will provide enlightened and strong leadership in respect to the stewardship of our beleaguered global environment, will doubtless look to this ANWR outcome to see if the U.S. is as resolute at home as it expects others to be elsewhere in the appropriate disposition of our common environment.

Thank you.

Senator **Wirth**. Senator Murkowski.

Senator **Murkowski**. Thank you, Mr. Chairman.

I would like to just reflect on the witnesses' testimony, some of which I have read and some of which I have heard. And it is my understanding that the issue before us, as a consequence of this committee's action by about a 2 to 1 majority, was determined to move forward on legislation to authorize oil and gas leasing in the 1002 area. I don't think that's a secret to our witnesses today. And it was the intention of the Chairman to ask for advice on how to improve the legislation that is before us.

In my opinion all too often issues regarding development of Alaska's resources are either typified in a black and white scenario, either development or environmental protection, not both, but one or the other. I happen to feel this is a misconception. I think those that are with us today know that Alaskans care very much about the environment of their State. We have witnesses from Alaska who will be testifying to that point, and that basically Alaskans and our State will not stand for anything that is going to destroy that environment. I think we can make the case that we have proven that the north slope oil exploration has been done with great consideration for the ecology and the environment. With the technology that has developed, a better job can be done if indeed there are substantial and economic reserves in ANWR.

So, what we are looking for is specific testimony on how this can be done. And I recognize that that perhaps comes as a conflict in the objective of the witnesses, but I think that is where we are on the issue.

I guess my concern—and I would voice this to the panel—is whether or not you basically share that objective in the manner in which your testimony has been prepared, or if indeed your position is a black and white position that we just shouldn't consider what we have considered and voted out 2 to 1 to proceed in a positive, constructive effort to try and make it better. And I just wanted initially for the record to note, Mr. Chairman, the position of our witnesses, whether their testimony is to be taken as constructive, to develop the legislation better so that we can proceed with the leases, or if basically it is in opposition. And I would ask the panel to respond as they see fit to that specific question.

Dr. **Freeman**. Senator Murkowski, I can respond. My written brief speaks to this issue.

I am concerned about the plurality of interests that are involved, and I am very aware of the fact that within the villages, as well as within metropolitan areas distant from the villages there is an interest in development. There is a dependency on jobs, and there's a dependency on economic development represented.

I am just here to urge extreme caution and, in fact, to see solutions to the answers, at least in a social sense, in terms of the social perturbations from the people who will be most affected, the people whose testimony has given evidence of the importance that these resources have on their continuing life style and preferred way of life.

There are solutions clearly, but the solutions are generally not those imposed from without. Very often that becomes part of the problem rather than the solution. And it often takes a good deal of time to think through these issues. And if I may remind the panel, in the case of the McKenzie Valley pipeline inquiry in the 1970s, Mr. Justice Thomas Berger recommended a 10 year moratorium on development just because the concern was the time it would take. The lead time to prepare villages to sustain the impacts required that period of time.

I am just concerned that when it seems to be demonstrated the need for these resources is not imminent, that we have our priorities straight.

Senator **Murkowski**. Well, I appreciate that, and I gather that your testimony can be deemed to be supportive in a broad, broad sense as opposed to particular recommendations that would enable us to introduce amendments or make other necessary changes that would, indeed, allow us to go ahead with leasing and with exploration or whatever, but is specifically related to the aboriginal, traditional concerns of our people.

And of course, I am sure you recognize that the time frame, as an estimate of the witnesses over the last couple of days, seems to indicate that it is going to be the year 2000 before there is any production, if indeed there is oil found. And I guess the question we all are concerned with is what's a reasonable time for these considerations to take place and recognizing that we have had the experience in the Canadian Arctic as well as Prudhoe Bay.

Specifically, Mr. Fisher, you suggested that we should be looking for oil in places other than ANWR. Yet, has your society supported oil and gas development at alternative sites? For example, would the Wilderness Society support California OCS lease sale or development of the Georges Bank?

Dr. **Freeman**. Senator, I would have to know the specifics of where the development might be before I could really respond to that.

Obviously, if the Arctic Refuge is to be explored and perhaps developed, it ought to be done and the leases arranged with careful thought to the other values involved, wildlife, wilderness, ecosystems. That's for sure. But the burden of my views is simply this that there are many, many other equally good and probably better prospects for finding and producing oil elsewhere in Alaska, elsewhere in the other States, than going to this particular piece of land that we call ANWR.

Senator **Murkowski**. Well, I assume there would be some who would dispute that because obviously ANWR is probably the most attractive site in Alaska. And as I think witnesses indicated the other day, the success on OCS in Alaska has been very, very poor. Of course, there are areas such as the California Santa Barbara area which has a great potential. But I assume you would not support that particular area but suggest that we go to another area. Is that right?

Dr. **Freeman**. That is right. But I can't speak to other areas in specific terms——

Senator **Murkowski**. I understand.

Dr. **Freeman** [continuing]. Without knowing the facts.

I am aware, and I am sure you are, that the national petroleum reserve hasn't panned out very well so far.

Senator **Murkowski**. Well, one has and one hasn't. The one in Bakersfield produces and the——

Dr. **Freeman**. No. I'm thinking of the ones——

Senator **Murkowski** [continuing]. Naval petroleum preserve no. 4—they never have been able to find any oil——

Dr. **Freeman** [continuing]. The one in Alaska.

Senator **Murkowski** [continuing]. Of any consequence.

Dr. **Freeman**. The evidence, as I read it, is that the likelihood of finding economical oil in the Arctic Refuge is no better than in the other reserve. But then there are numerous other possibilities.

Senator **Murkowski**. The record will note whatever the experts say.

Dr. **Freeman**. There are some 83 billion barrels of estimated recoverable on-shore oil round and about in the country, and 300 billion barrels, thereabouts, of oil known to lie around in currently producing fields that really can't be developed economically without some further technical improvements which are I think as likely to happen——

Senator **Wirth**. This is that wonderful time you're familiar with, Mr. Fisher.

Mr. **Fisher**. Nothing has changed.

Senator **Wirth**. We will go over and vote, and then we will be right back.

[Recess.]

The **Chairman** [presiding]. I apologize to our witnesses for having to be on the floor. I think I will be able to stay here throughout the next amendment, and then must go back when the DeConcini amendment. That is a very bad amendment, and we must go through all we can to defeat it. [Laughter.]

But for the meantime, I'll be able to stay, and so my apologies to the witnesses.

As I am sure some of the other Senators have mentioned, what we have done on the committee this year is, first of all, held generalized hearings on the issue of ANWR. Then we took the committee to Alaska, and after that I polled the committee members on the question of whether they wish to proceed with legislation to open up ANWR during this Congress. Frankly, I did not lobby any member in either direction on that question, but simply asked the question whether they wished to proceed. And by greater than a 2 to 1 margin, the committee members said that they did wish to proceed with legislation this year.

And so, these hearings we have now are for the purpose of beginning with the Murkowski bill, which is, of course, not a final bill by any means. It is simply a matrix to discuss and to give us a beginning point for constructing another bill. Nevertheless, it is our intention to report legislation out of this committee and to do so with some reasonable speed because in order to get legislation passed, we must report it this year, which is not to say that a witness must support any legislation. Of course, I understand your very eloquent statements against the legislation in general are welcome and we are glad to have them.

But my question now is, assuming that there is going to be legislation, is there any suggestion you can make as to how we can make that legislation better, how it can better protect the environment. Does anyone have any specific suggestions?

And let me also emphasize that the fact that we took that preliminary vote does not bind any member here to vote for any legislation. They may change their minds completely. So, you will have your chance further to urge members to vote no on any legislation to open up ANWR. But if we do have legislation, and we do intend to report that, does anyone have any suggestions on how to make it better?

Ms. **Speer**. Senator Johnston, thank you.

With respect to specific stipulations, as I said in my testimony earlier, we don't think that there is sufficient information about a lot of the impacts to develop adequate stipulations. And one thing the committee might consider doing is to order, for example, the Fish and Wildlife Service and the EPA to do a joint study of some of the—to fill some of the data gaps that remain over the effects of development in Prudhoe Bay so that we can then begin to look at what and if stipulations and mitigating measures are appropriate.

Ms. **Sheldon**. Senator Johnston, I would agree with that. I think at this point the National Environmental Policy Act underpinnings of this legislation are extremely shaky. The legislative environmental impact statement has been called by EPA insufficient legally. It does not do what it ought to do by way of telling the members of Congress, particularly this committee what the potential impacts of this development are. It does do a reasonable job of generally categorizing and cataloguing the wildlife and other critters that occupy the coastal plain and describing the environment. So, your baseline information is missing.

Moreover, in the bill as proposed now, the NEPA compliance process causes me great concern. The bill proposes to make the legislative environmental impact statement suffice for NEPA compliance at this time, and suggests that environmental impact statements or environmental assessments can be prepared at a later time on particular aspects of exploration and development. And I think that this will be an effort to describe what is left of the animals in the barn after the door is opened and they have all run off. And it will be far too late in the process.

And so, some very careful attention needs to be paid to coordinating NEPA with any bill that is concerned with opening up this area for oil and gas exploration and development. We are going to have to design a new NEPA process. And I don't think the bill as currently proposed adequately does that at all.

I do have to say that Senator Murkowski before he left posed the question in terms of black or white. Of course, he regards that as a very negative way to look at it, that we are either opposed to development in order to protect the environment and that we seem not to have presented in our testimony any way to do this in a responsible manner. And I would like to step up to that plate and say, yes, it is a question of development or protecting the environment. If we eventually decide—if you eventually decide to pass a bill that allows for oil development in this area, then we should do whatever we can to minimize it.

But we should not be fooled into thinking that we are going to have what we have there now, and we should not be fooled into thinking that we can do much more than to ameliorate some of the more serious effects. We are not going to be able to prevent most of them. We are not going to be able to halt most of them, and we are going to irreversibly change the area. And I don't regard that as a negative message. I think that it is wise to face the decision squarely. And it is a complicated social decision. You have to weigh and balance the costs and benefits.

I think the fundamental problem is that we assume that oil is a more important and more valuable resource than the other environmental resources of the coastal plain. And in our view that is not correct.

The CHAIRMAN. Mr. Fisher?

Mr. FISHER. I might add this. In addition to a much more thorough assessment of the environmental pros and cons, I think there ought also to be a pointed and very careful assessment of alternative sources of oil supply whether in the positive sense of finding the oil elsewhere or improving the conservation programs one way or another and save the equivalent amount in that way. And it seems to me that ought to precede any leasing program. Indeed, these findings might bear heavily on the restrictions and so on that conceivably could go into a leasing program.

The CHAIRMAN. Thank you.

Ladies and gentlemen, thank you very much for your testimony. Again, my apologies for being absent during part of it. But I have read part of your statements, and I assure you I will have them all read carefully before we go to markup on this. Thank you very much for your attendance.

Finally, we are pleased to welcome our next panel: Celia Hunter from Fairbanks, Alaska; Debbie S. Miller also from Fairbanks; and David Brower from Berkeley, California. I guess Ms. Hunter would lead off unless you have any alternative.

STATEMENT OF CELIA M. HUNTER, FAIRBANKS, AK

Ms. HUNTER. That's fine.

My name is Celia Hunter. I am from Fairbanks, Alaska. I have lived in Alaska for 40 years.

I have been associated with the environmental movement in Alaska since the beginning of the first statewide Alaska conservation group, which was the Alaska Conservation Society, of which I was one of the founders and the executive secretary for the first 12 years of its life. The Alaska Conservation Society was founded because of the issue of the Arctic National Wildlife Refuge.

The plan to make a refuge in this northeast corner of Alaska has a historical significance that goes back certainly to immediately after World War II. The first people who were involved in setting this area aside or in the research which led to its delineation were Dr. Frank Fraser Darling of England, who is a noted ecologist in England; Lowell Sumner who was a biologist associated with the National Park Service; and George Collins, who was a planner for the National Park Service. These men did a lot of research in the area—on-the-ground research—during the period around 1949 to 1950. And as a result of that, they had determined that this area represented one of best areas for preservation on the whole arctic coast.

Many people have followed them in studying that, and among them are Olaus and Marty Murie who were in the Sheenjak River valley in 1956 on a reconnaissance, a biological reconnaissance, from which Olaus, who was then the head of the Wilderness Society, eventually drew the boundaries for the original Arctic National Wildlife Refuge, which was prior to the ANILCA legislation which expanded it considerably.

The wilderness values in the Arctic National Wildlife Refuge are enormous. And they center on the coastal plain. It is as impossible to remove the coastal plain from the Arctic National Wildlife Refuge as it would be to take out the central valley of Denali National Park, the road corridor, and then say that you would have made no effect on the value of Denali National Park. In both cases these areas, while they may not be the most scenic in the park or in the refuge, are of inestimable value in wildlife habitat, and it is quite impossible to eliminate them without serious effects on the wildlife in the region.

I think that the importance of the coastal plain in this respect may not have been brought out to the members of your committee when you decided to go for oil development because I think that there has been a lot of gagging, shall we say, of the people within some of the agencies of government, both State and Federal, in terms of making a decision first and then seeking to find justification for it later.

I think one of the things that is evidence of this came out in a paper of a staff meeting that Robert Gilmore, who was then the regional director of the Fish and Wildlife service in Alaska, where he is stating that if it is true that oil and gas development on the Arctic Refuge is going to decrease the caribou populations 20 to 40 percent, let's face it. In that case development would be unacceptable, and there would not have been a recommendation for development.

The question of how much the caribou population will decrease if their calving grounds are disturbed and if their entire habitat—I have seen the animals of the porcupine caribou herd as far west as the Canning River. So, they obviously use that entire area from time to time. This was in the middle of the summer.

And I think that we have to recognize that we need the facts on the other values in this refuge if we are going to make a good decision about whether it should be developed or not. And I am afraid that the facts that are needed are not being brought out in part because the top level officials have decided in their own minds that this is going forward and, therefore, they don't want any interference with that decision.

I would also echo the uselessness of stipulations and permits in the case of protecting the land. I have one paper here which is very brief. It is talking about the gravel deposits that were taken out in the situation of the Kaktovik KIC well which is very close to the town of Kaktovik, and where the U.S. Fish and Wildlife personnel who went up there to study both the gravel storage sites and the gravel pit determined that numerous violations of stipulations had occurred and that much of the activity was without permit.

I am afraid that there is a great gap between what you get on paper and what you actually have the bulldozer drivers observing. And I have seen this happen all the way along. And certainly it was true in the construction of the trans-Alaska pipeline. It has been true in the work in Prudhoe Bay, and I think it would be equally true—it has been true in the one well that has been drilled so far on the Arctic Wildlife Refuge.

I think when the statement is made that this panel and the previous panel are probably going to be a totally black and white—or try to make a black and white situation out of this, I do not favor any oil development on the coastal plain. I favor total wilderness. And I think I am as justified in seeking total wilderness as the oil company personnel who came out yesterday and declared point blank that they are in favor of 100 percent leasing of the entire 1002 area. They were not willing to compromise in any way, shape or manner. And I think to say that this is perfectly all right on the one side and to object to those of us who favor the wilderness option over development on the other side is giving a very one-sided effect to the argument.

I think that until I had seen Prudhoe Bay this last summer—I have lived in Alaska a long time, and I have been up and down the pipeline haul roads. And I was a member of the Federal-State Land Use Planning Commission. But at that time Prudhoe Bay was just going. And I was utterly amazed at how much development has occurred in 15 years because that is literally the amount of time that the oil companies have had to develop Prudhoe Bay. And that complex is mind-boggling. It extends for at least 50 miles along the arctic coast there in the central part of the north slope. It extends in a depth of at least 20 to 30 miles.

And when you realize that this kind of development would be transposed almost literally onto the coastal plain of the Arctic National Wildlife Refuge, you realize that there is no opportunity for mitigating the effects. You will have a Prudhoe Bay. And while you may say that it won't occur all at once, and various statements have been made that it is going to be phased-in development effort and that sort of thing, the infrastructure that goes with oil exploration and development, the use of gravel to make pads for roads, pipelines and that sort of thing, the use of water, 15 million gallons of water to drill one well, mean that there is going to be significant impacts no matter how slowly they go ahead. And there is no evidence that there will be any lack of speed in going ahead to get out oil if oil exists there.

And I just simply cannot see the value. I think there is a value in the wilderness, a value in that of total ecosystem to the United States, to the whole world, which has not been recognized in this legislation. And I think the decision needs to back up and look at whether or not this should be developed, rather than saying if it is developed, what are we going to do about it.

Thank you.

[The prepared statement of Ms. Hunter follows:]

STATEMENT FOR HEARING BEFORE THE SENATE ENERGY COMMITTEE
WASHINGTON, D.C. - OCT. 15, 1987
Prepared by Celia M. Hunter, 1819 Muskox Trail, Fairbanks, Ak 99709. speaking for herself.

My name is Celia M. Hunter, and my home is Fairbanks, Alaska, where I have lived since arriving there forty years ago, on Jan. 1, 1947. Like most Alaskans, I just came up to look around, and wound up becoming a part of the country.

I came to Alaska as a pilot, ferrying a war surplus airplane up the Alaska Highway from Seattle to Fairbanks during December, 1946. During World War II, I served as a member of the Women Airforce Service Pilots (WASP), in the Ferrying Division of the Air Transport Command. However, in wartime, the WASP had not been permitted to fly into Alaska via the Northwest Staging Route, so another ex-WASP and I jumped at the opportunity to fly this route, even in the dead of winter.

Over the years, I have seen enormous changes take place in Alaska. When we landed in Fairbanks, it was a town of only 5,000 residents, and was the jumping off place for the whole northern part of Alaska. Only the Steese Highway, terminating at the Yukon River at Circle, extended north of town. The Alcan Highway had been completed a short five years earlier, and had just opened to civilian traffic.

The Alaskan bush country was much the same as it had been when white people first came. Native villages were very small, and most of the inhabitants still followed a subsistence way of life, hunting, fishing, picking berries and building with wood found nearby.

My early impressions in flying over the wilderness north and west of Fairbanks was one of awe at the vastness of this seemingly untouched land. It was easy to imagine that nothing could really change this country, even though I was familiar with the extensive scarring of the landscape around Fairbanks caused by the mining dredges in their quest for gold.

There were few people in Alaska who thought of themselves as conservationists in the late 40s and early 50s, and no organized conservation movement. The only areas which had been given permanent protection by Congress were Mt. McKinley National Park, and the two National Monuments - Katmai and Glacier Bay.

It is worth remarking that as early as 1950, certain far-sighted individuals were risking their necks flying about the Arctic Coastal plain and the Brooks Range in the northeast corner of Alaska, thinking about how best to preserve a generous portion of this unique mountain and tundra ecosystem for the use and enjoyment of present and future generations.

These men: George Collins, a National Park Service planner, Lowell Sumner, a biologist, and Dr. Frank Fraser Darling, an outstanding English ecologist with extensive experience in the Scottish Highlands, made up this team. Dr. Darling was impressed with the similarities between northern Alaska and the Highlands of Scotland, because he saw in them the richness and variety of flora and fauna typical of the Scottish mountains before they were overrun with domesticated sheep.

Olaus Murie, a wildlife biologist who had done extensive work on caribou in the early 1920s, and his wife, Mardy, who had grown up in Fairbanks from 1909 through the early 20s, followed the initial exploration work and spent the summer of 1956 doing a reconnaissance in the upper Sheenjek River valley with several young biologists from the U. of Alaska.

Olaus Murie actually sketched out the boundaries of the original Arctic National Wildlife Range, which was proposed in legislation in the late 1950s. Then, as now, the Alaska Congressional delegation was opposed to any federal withdrawals of Alaskan territory. Senators Bob Bartlett and Ernest Gruening held hearings in Alaska on the proposal during 1959, but continued to oppose the withdrawal.

It was these hearings which convinced a number of Alaskans that we needed a state conservation organization to represent our views, so that the legislature and business groups would recognize that Alaskan residents held strong conservationist views. We founded the Alaska Conservation Society, which became the first statewide all-Alaska conservation voice.

Working for the establishment of the Arctic National Wildlife Refuge, the major concern of the ACS was to preserve this unique far northern ecosystem in its entirety, both because of its scientific value as a base line against which to note changes in the rest of the arctic, and for its outstanding scenic and wildlife values.

Though we had no idea of the oil find which would occur at Prudhoe Bay, we were well aware of the pressures in Alaska and elsewhere which would seek to capitalize on every available resource for economic development. Even the seeming remoteness of this corner of northeastern Alaska would not protect it.

This is the background against which I advocate no oil exploration or production on the Coastal Plain of ANWR. There is simply no way to make the development of an oil field compatible with wilderness preservation.

The destruction of the wilderness values of the 1002 area will occur even though some of the flora and fauna remain among the maze of gravel pads, buildings, roads, pipelines, and miscellaneous development which would totally obscure the coastal plain. The oil companies point to the forlorn and isolated caribou wandering through the Prudhoe Bay complex as evidence of the coexistence of wildlife and oil production.

What they don't discuss is the fate of numerous other species, including all of the predators, which, naturally, are banned from Prudhoe Bay, and would be shot on sight in any oil complex, either as a deliberate policy or because oil company employees would look upon them as unsavory varmints.

I'm glad that I had the opportunity to visit Prudhoe Bay this summer while the various Congressional committees were there. Flying over the complex, and driving along the miles of roads, including the trip out over the causeway to the Endicott Island operation, was an eye opener. I had not realized the extent of this operation, nor the enormous quantities of various resources such a complex absorbs.

It extends at lest 50 miles along the coast, and probably 20 miles inland. I tried to imagine what it would be like to put this sort of development on the 1002 area of the ANWR coastal plain. It would completely eradicate the natural landscape from the Canning River to the end of the Sadlerochit hills. If you were to stand atop the Sadlerochit Hills above the springs, and look northward, the entire plain would be a maze of gravel pads, buildings, pipelines, and roads.

The noise from internal combustion engines on the ground and in the air would destroy the natural silence. Access by the general public would be cut off - no more rafts could negotiate the northward flowing rivers between the Brooks Range and the sea, no more hikers could wander over the tundra, no hunters could take their snow machines from Kaktovik to the Brooks Range.

The oil companies emphasize that damage to the natural landscape would be minimal, because there are so many stipulations in place to which their activities must conform. I cannot believe that such stipulations or permits will actually mean anything when oil drilling and production are under way. The agencies which will have to enforce such regulations are even now short-handed, and prospects for any additional funds to expand their capabilities are unlikely.

The Chevron well drilled on Native lands near Kaktovik, the KIC well, was supposed to be the cleanest job done by the oil industry, and yet the number of permit violations in the procurement and storage of gravel is extensive. (Report of site visit by personnel from Fairbanks Fish and Wildlife Enhancement Office, USF&WS, dated Sept. 10, 1987)

It is practically impossible for biologists and bulldozer operators to communicate because they approach situations from such widely separated viewpoints. A biologist sees the tundra divided into myriad micro-climates each of which may be vital in the existence of one or more species. Many of the micro-organisms making up this system are too small to be seen by the naked eye, and yet they can be vital to the food chain of both wildlife and birds.

How do you translate this into a regulation which makes sense to a man whose job it is to locate, dig out, and stockpile gravel for a drill pad? Who will be around to interpret the rulings while the job is under way? What authority is given to biologists within the heirarchy of the oil industry so they can have enough staff and enough clout to blow the whistle under actual job conditions?

This coastal plain is not a spectacular scenic landscape, but it has an ambience which weaves a spell for those who take the time to wander through it on the ground or via its waterways. The amount and variety of its birdlife, the many smaller mammals which live there, and the opportunities to witness massive caribou movements, or observe wild muskoxen grazing along river banks, to come upon bear or wolf makes this an extraordinary experience for both the experienced traveler and the neophyte.

In reading Senator Murkowski's bill I note that he pays lip service to protecting "the area's fish and wildlife resources and environment and the needs of the area's subsistence users which utilize the public lands of the coastal plain."

What does this mean? Throughout the rest of the bill he insists that the interior Department's seriously flawed environmental impact statement for the 1002 area shall be deemed adequate to satisfy any EIS requirements, and he wants to remove all activities on the Coastal Plain from any further land management reviews.

The idea that subsistence activities could proceed as usual after the oil companies take over the coastal plain is ludicrous. The security enforced within Prudhoe Bay is even more restrictive than on a military base, and the rules and regulations governing alcohol, drugs, and firearms are very explicit.

I can foresee what will happen to an Eskimo from Kaktovik when he slings his rifle over his shoulder, puts his six-pack of beer in his pack, mounts his snowmachine and seeks to cross through the oil company compound on his way to hunt in the Brooks Range.

I can also see what will happen to the present and expanding recreational use of the rivers and lakes within the 1002 area. Oil development is incompatible with every other use of any area while the oil field is in production. And what they will hand back to the public will be a devastated area, forever scarred and polluted. What has happened to Louisiana could happen to Alaska's North Slope.

My question is: What will the people of the U.S. be getting that is worth what they will be giving up? At best, a brief moratorium of the inevitable day of reckoning when the U.S. and the world must begin to wean themselves from oil gluttony. And there is always the possibility that this touted bonanza may turn out multiple dry holes, and so provide not even a temporary respite.

I, for one, am not willing to sell my birthright in this piece of wilderness for any oil development at all, successful or no. When I say that, I know I am speaking for countless others throughout the U.S. and Alaska, and even worldwide - for this area provides wilderness lovers from many countries with an opportunity unknown in their homelands.

Thank you for this opportunity to present my views to your committee.

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The CHAIRMAN. Thank you very much, Ms. Hunter.

Ms. Miller?

STATEMENT OF DEBBIE MILLER, FAIRBANKS, AK

Ms. MILLER. Well, I have to agree, first off, with Celia's comments. This is the foremost wilderness in America for those of you who haven't had the opportunity to see it.

I have lived in Alaska for 12 years now. I taught in a small village on the southern boundary of the refuge, Arctic Village, and had the opportunity to spend most of my summers from 1975 to 1979 backpacking, kayaking, climbing the highest glaciated peaks in the Brooks Range within the Arctic Refuge. And I have crossed the coastal plain numerous times. This summer I took my one year old daughter onto the coastal plain. We stood out there camping amongst the mosquitoes, and we were able to witness the aggregation of 20,000 to 30,000 caribou walking by our camp. We had a wolf that walked right next to my camp that my daughter spoke with. We had a wolverine come into our camp. There are grizzly bears all over the place, musk oxen.

This place has the richest and the most diverse species of arctic species that is currently in a conservation area. It is the only place where an American can go into a complete arctic ecosystem and see these kind of wildlife spectacles.

Assistant Secretary Bill Horn spoke the other day and said there is nothing unique about the coastal plain. If you were to take a one square foot patch of tundra and compare that one square foot patch of tundra on the coastal plain of the refuge with something over in the naval petroleum reserve, he's absolutely right. There's really probably not that much difference. We probably would find the same lichens, the same mosses, et cetera. And as he mentioned, there was one rare plant that was found on the coastal plain of the refuge. But that's all he could come up with.

Well, I guess I'm here to try to enlighten you that, number one, the coastal plain is unique. It is a part of the total ecosystem, total arctic ecosystem, and to remove it from that ecosystem is like removing Yosemite Valley from Yosemite National Park. It's like taking the torch off the Statue of Liberty for New Yorkers and saying that that statue is still going to be the same. It simply is not. You can't remove the most biologically productive zone of a refuge, and say that it is going to be the same. This is where the wildlife go to bear their young. It is the mecca for wildlife whether you are talking 180,000 caribou, whether you are talking 500 musk oxen, whether you are talking 300,000 snow geese that stage there.

This is a vitally important area, a vitally important ecosystem for our country and the world. And you have to recognize it before you can begin to consider such an unacceptable bill.

I'm sorry, Senator Murkowski. Your bill is unacceptable. It is a black and white issue.

We have made a compromise on the north slope way back in the 1940s, unfortunately, and the 1950s. We have a national petroleum reserve which unfortunately proved to be fairly dry with its 18 to 20 wells which were drilled. However, I will mention that there is 6 billion barrels of oil in the NPRA. They are considered marginal fields. Yet, they do lie near the Coleville River and from my conversations with people within the national petroleum reserve, even those marginal fields may prove to be recoverable as the price of oil goes up. Everything is dictated by the price of oil.

Within the Prudhoe Bay area, we have the Kuparuk field, the second largest petroleum field in the United States. Nobody knew that field was going to be discovered after Prudhoe Bay. We just happened upon it.

We have Milne Point that is shut down that is not in production because the price of oil is too low. We are talking about multinational oil, oil that may potentially be transported to Korea, to Canada. I mean, this national security argument is bogus.

There is no sense. There is no justification for going into our only arctic refuge for 3 to 4 billion barrels of oil or even more when we have 20 billion barrels of oil sitting in the West Sak Formation. ARCO has reported after their two year pilot test program that, oh, yes, we can get that oil out by conventional means. That was an unknown before. For years we were told, oh, we can't get the 20 billion barrels out. It's in a sandy formation. It's heavy crude. We need shovels to get it out. Well, they had a test pilot project that was reported in the Alaska Reporter that stated that they can get that oil out by conventional means once the price of oil goes up and its economically profitable for the corporations, obviously.

So, how can we justify going into a refuge? We don't know what is there, and we know there is 20 billion sitting next to Prudhoe Bay. That is larger than what is estimated in the Prudhoe Bay reserve. Why don't we hear about this? The industry doesn't want to talk about it. They want access to the entire north slope.

Second, nobody has brought this to light. Please take note of this, staff. I am disappointed there are only two Senators here. I'm glad the Chair made it back. I appreciate you coming back otherwise I would have only had you in the elevator for two minutes. Please take note of this.

The State of Alaska every year releases a five year oil and gas leasing plan. In that plan that was released January 1986—it will come out again in January 1987—there are 13.5 million acres of onshore prospects near Prudhoe Bay that may be proposed for lease sales, that have been identified. Now, we are talking lease tracts that have moderate potential, classified as moderate potential: the Kuparuk River unit, the north slope foothills. I urge you to review this report to get a sense of what kind of development we are talking about on the north slope.

This is a black and white issue, but for good reason. We have made a compromise. We have a commercial zone, if you will, on the north slope. We have a 900 square mile zone of development on the north slope. We have our green belt, if you will, within the Arctic National Wildlife Refuge, and we have a purpose for keeping that green because we have got all the development to the west. Let's be fair. As Americans we want balanced resource development. We don't want to lock it all up. I mean, that's ridiculous. I drive a car and so do you.

But this is a myth that there are no other options for oil development in this country other than the Arctic Refuge. It is a drop in the world bucket of oil—a drop. And 4 to 6—or whatever it is—$2 billion to $4 billion in lease sales is a drop in the Federal deficit whether you are talking trade deficit or whether you are talking Federal deficit. It's a drop.

And if that is what this issue is all about—money—I am really sorry to be speaking to this committee because you have to be responsible. You have to look at why we have wildlife refuges in the first place.

And I would like to say that Senator Murkowski's bill is basically based on a very false assumption when he says that in 1988 we are going to have this horrible decline, that there is no oil around Prudhoe Bay when we have got all these producing fields that are just starting on line. Endicott, by the way, just opened up last week. There's a 3 billion barrel field I understand. It just opened last week. And it is not marginally anymore because the price of oil went up a few dollars, and now it is economical to recover it. And so, they have opened 100 wells pumping their way onto manmade islands. That's an off-shore find 15 miles off of Prudhoe Bay.

This comment that the oil industry will only impact 1 percent of the coastal plain—I will say that's a very strong, strong argument on their behalf—1 percent, the 11 square mile footprint. There's a problem with that. If you take a box of Leggos, if any of you have kids, and you build your Leggos on the rug in the living room, your nice carpet floor, you have a lot of carpet left on that floor, but it doesn't quite look the same, does it? And if you try to walk to the kitchen from the living room, you are going to trip. [Laughter.]

So, I mean, think about it. Sure you have got an 11 square mile footprint of gravel. That's not much when you are talking 1.5 million acres, but you have got to imagine. We are talking about 380 miles of roads. We've got pipelines, production facilities, causeways going out off-shore.

And I have stood on top of one of the highest peaks within the refuge—highest glaciated peaks—and I can see the Arctic Ocean from that peak. I can look out across the coastal plain. I can see Dall's sheep below me. I can look out there and imagine caribou. With binoculars I might even be able to see those caribou. And if you put the Prudhoe Bay infrastructure on that coastal plain, you not only destroy the coastal plain, you destroy the entire wilderness value of the 19 million acre refuge. There is no doubt about it. Believe me.

And there may be only a few people that have the opportunity to go into that place, but a lot of people have a dream to go there. I read about Antarctica. I am glad it exists, and I don't want to see it—I'll probably never go there. And I don't want to see it developed. And we have a dream in America that wildness exists on our planet, and we have got to keep that dream.

Finally, I do want to submit one thing for the record because I don't want to take too much of the Chair's time. You probably have other things to do like vote on amendments on the floor. There is one serious problem that has not been addressed and this involves Senator Murkowski's bill. And this is the compelling evidence that he refers to about wonderful development at Prudhoe Bay.

Please keep in mind the facts. We have 18 years of development at Prudhoe Bay—18 years. The State of Alaska—these are State leased lands. The State of Alaska has been in charge of monitoring those lands. For years, while I was living in Fairbanks, there was one man within the Department of Environmental Conservation that was responsible for monitoring every oil spill north of the Alaska Range. Now, I can't give you an exact acreage of how much land that was, but it is probably at least the size of what, Celia? Maine, or more?

Ms. HUNTER. More.

Ms. MILLER. Maine, New Hampshire, Vermont. We are talking an incredible amount of acreage. One man.

The State of Alaska only recently began to monitor Prudhoe Bay in 1982 I believe. And that wasn't even on a regular basis.

This summer U.S. Fish and Wildlife Service began the first study on the effects of contaminants from drilling muds on birds—the first study. We have 18 years of development, and we are just now looking at what those heavy metals and hydrocarbons are doing to our waterfowl. And we have got 2 million birds that migrate to the refuge to have their young, and we are saying that Prudhoe Bay has a clean record, and we don't even know.

I called EPA yesterday after listening to Mr. Herrera say, oh, that we only have a trace of heavy metals in the drilling mud, and we have gotten rid of the chromium, and we really have nothing to worry about. Well, true, Mr. Herrera, they are using less chromium in the drilling mud. Yes, we will grant you that.

But I would like to submit for the record a report that is in press, that will go to publication, a U.S. Fish and Wildlife Service report. It was given to me before I got on the plane without an FOIA, which in many cases that is what you have to do to get anything out of the U.S. Fish and Wildlife Service. This report, "Effects a Prudhoe Bay Reserve Pit on Water Quality and Microinvertebrates of Arctic Tundra Ponds in Alaska"—it's a long report.

In summary, I think Lisa Speer has already indicated in her testimony that there are some concerns about drilling muds. Reserve pits are not going to go away. The solid waste rigs in Alaska, which the industry spoke of—they have nothing in there that mandates reinjection.

We have reserve pits. We will continue to have reserve pits. They may or may not leak. They will continue—the way the regs are written now, they will be allowed to discharge certain amounts from these pits.

And Mr. Chairman, if I am going over time, please let me know. But as long as I have traveled all the way from Alaska with my one year old, I feel like I need to explain these things to you since nobody has brought it to light it seems like, at least in the manner that I feel.

I will list in this report the elements that were found in 21 sample ponds around Prudhoe Bay in 1983: chromium, barium, which clogs fish gills, by the way, arsenic, zinc, nickel—I can't pronounce it—aliphatic hydrocarbons which are supposed to be bad. I have no idea what they are. Copper, lead, cadmium. There are numerous heavy metals associated with drilling muds. Mr. Herrera said we have a little problem with chromium. And they seem to have figured that one out and taken that up. But we have other metals that are associated with it, and hydrocarbons and oil spills, and the list goes on.

There has not been a study conducted by EPA or U.S. Fish and Wildlife Service that looks at the biocumulative effects of these hazards. There has been no money within EPA.

So, on that note I think I have brought some of the key issues that I feel the committee ought to look at before they consider passing such an unacceptable bill.

And I would be happy to answer any questions, and I guess we would turn this over to David at this point.

[The prepared statement of Ms. Miller follows:]

Testimony for the

Senate Energy and Natural Resources Committee
concerning the Arctic National Wildlife Refuge

by

Debbie Miller

October 15, 1987

Mr. Chairman and members of your committee, my name is Debbie Miller and I presently reside in Fairbanks, Alaska. I am honored to speak before your committee concerning the Arctic National Wildlife Refuge, a place that I have grown to cherish over the past 12 years because of its unique wilderness, wildlife and recreational values.

For the record I strongly oppose S.1217. The only possible remedy for improving this bill is to kill it in committee. Opening the coastal plain of the Arctic National Wildlife Refuge to oil and gas development will completely destroy the wilderness quality of the area and adversely effect many Arctic species that thrive in this region. The draft 1002 report to Congress documents these adverse effects on caribou, musk-oxen, snow geese and other species even though the Secretary of Interior seems to have overlooked such negative impacts.

I would like to share with you some of my personal experiences within the Arctic National Wildlife Refuge and why I feel that it is in the best national interest to designate the coastal plain as part of the Wilderness Preservation System.

In 1975 I was fortunate to obtain a teaching position in Arctic Village, a small Athabascan Indian village of about 150 people, located just south of the Arctic Refuge. I say that I was fortunate to teach in Arctic Village for two reasons.

First I was exposed to a remarkable subsistence-based culture of the Athabascan people, a people who have for centuries been deeply bonded to their homeland which extends into the Arctic Refuge. I learned how to tan caribou skins and sew caribou skin boots and mittens, clothing items that all Arctic Village residents wear. My husband and I hunted with local residents and learned how the caribou was completely utilized by villagers and shared amongst families. I watched women make skin tools from caribou and moose leg bones and elders traditionally save caribou hooves. During times of starvation, several decades ago, the hooves were used to make a soup when caribou meat was not available.

The people of Arctic Village continue to depend on the Porcupine caribou herd today as their mainstay. Villagers are strongly opposed to oil and gas development of the coastal plain, the calving grounds of the herd. I am not speaking on behalf of the people of Arctic Village, particularly since you will hear from their own leaders. I am simply offering you a glimpse of some of my personal experiences while living in the village.

Second, by living in Arctic Village I was most fortunate to be introduced to the Arctic National Wildlife Refuge. During summer months between 1975 and 1979, my husband and I spent the majority of our time exploring the refuge on foot and by kayak. Since moving to Fairbanks we have continued to return to the refuge for work or recreation. Why have we continued to go back? Because we feel that the area offers the greatest wilderness experience of any region within the United States.

I base this on the fact that prior to our move to Alaska in 1975, my husband and I led outdoor education trips in California, Arizona, Washington and Canada. We extensively hiked, skied and climbed glaciated peaks throughout the Sierra, Cascades and Canadian Selkirk Ranges. We shared many wilderness experiences with hundreds of students. Some students have written us in recent years to tell us how meaningful those outdoor experiences were, and how they've continued to seek further wilderness experiences, some in Alaska.

What I thought was so-called "wilderness" on the west coast doesn't begin to rival what is found in the Arctic Refuge. Although these southern areas offered beautiful scenery and some wildlife, none offered the kind of primitive wilderness experience that the Arctic Refuge offers. None offered the kind of wildlife spectacles seen on the coastal plain of the Arctic Refuge, in particular the aggregation of the 180,000 member Porcupine caribou herd.

There is a distinct difference between the spectacular beauty of Yosemite National Park, and the beauty of our only Arctic Refuge. While Yosemite may be spectacular it also has its garbage bears, concessionaires, road system, established campgrounds, trail systems, pollution, traffic jams and signs. This unfortunately is true of many of our parks and refuge. They are easily accessible to man and subsequently more easily trashed.

Unlike Yosemite National Park, few people have ventured to the Arctic Refuge because of the great distance and expense. Yet it offers the ultimate wilderness experience in America. The Arctic Refuge is clearly the most remote and immense wilderness area in the United States. There are no visitor centers, no outhouses, no man-made trails, no established campgrounds, no pollution, and the nearest paved road from the coastal plain is roughly 400 miles away. It is the essence of our wilderness heritage. Although few people have visited the Arctic Refuge, many may dream of visiting such an area, and some may never see the area although they may be thankful that such a wild area exists for future generations.

One summer I led a rafting trip in the Arctic Refuge with a family from the Los Angeles area. This particular family had been on many backpacking and river rafting trips in the continental United States but had never experienced the Arctic wilderness. After the trip the mother of the family, Ann Boren, wrote me this:

> "...Thank you for arranging an absolutely spectacular trip for us. We all agreed that we simply could not have had a better trip nor a more thoroughly unique and enjoyable experience. The immensity of space, the stillness, emptiness and sense of wildness that is the essence of the Brooks Range and that wonderful evening light - were breathtaking...Of course the thrill of seeing the wolf den and wolves, the grizzly and the caribou herd was the opportunity of a lifetime. What wonderful luck!...It's a trip none of us will ever forget. Frank and I feel it's the best wilderness trip we've ever taken. We've fallen in love with Alaska and especially the Arctic National Wildlife Refuge."

The mother of another individual on the same trip later wrote me, "Arthur returned from the trip a richer person. We are grateful that he had this experience..."

I bring these comments to your attention so that you can gain a perspective on how important this wilderness area is for Americans seeking the ultimate wilderness experience.

In 1979 I was on a six week trek along the continental divide of the Brooks Range within the Arctic Refuge. We crossed one of the highest passes in the eastern Brooks Range. On that trip we saw three or four airplanes pass overhead and no other people. During this trip we accidentally stumbled upon Clarence Rhode's airplane which had been missing for 21 years. Rhode was Director of Fish and Wildlife Service for Alaska, then a territory, and a strong advocate for the establishment of the refuge. He crashed just two years before the Arctic Refuge was established. After he disappeared the government and private aircraft conducted the most extensive search in the history of Alaska and never found him. The fact that his plane sat there for 21 years (a visible orange twin engine Grumman Goose) gives testimony alone of how truly immense and wild the Arctic Refuge is.

The oil industry argues that the 19 million acre refuge can stand to lose the 1.5 million acre coastal plain; that there is plenty of wilderness left without it; that only 1% of the plain might be effected by development. Unfortunately this is not the case. The industry's argument is like saying that I shot the man but the bullet only made a small hole through his heart.

Developing the coastal plain will completely and irreversibly destroy the wilderness character of the Arctic Refuge. The coastal plain is an open, treeless, fragile plain and extremely vulnerable to man's disturbance. You can't have clustered development and plant trees around the infrastructure. You can't hide the 380 miles of roads, drilling pads, pipelines, production facilities, nor the air and noise pollution. The coastal plain averages only 25 miles in breadth.

I have stood on the top of Mt. Michelson, one of the highest glaciated peaks of the Brooks Range, located in the heart of the refuge. I've gazed across the coastal plain to where the Beaufort Sea meets the plain. In one far reaching scan of the eye I saw Dall sheep grazing on velvet green tundra slopes below me, our most northerly Arctic rivers winding their way to the sea, and I knew that somewhere out on the plain caribou were massing by the thousands.

The Arctic Refuge carries a wilderness sphere of influence stretching beyond its boundaries to the North Pole, east to the Northern Yukon National Park, and south to the Yukon Flats National Wildlife Refuge. When standing on the coastal plain, or on top of a glaciated peak within the refuge, you are standing on the edge of North America, on the top of the world, in the wildest of habitats. Oil development of the coastal plain would completely destroy the wildness of this northeast corner of Alaska.

This summer I took my one year old daughter, Robin, on her first wilderness trip in the refuge. She saw several thousand caribou walk by her, she talked to a wolf that marched by our camp, she made footprints on a sandbar next to the tracks of caribou calves and wolves, she saw a wolverine spy on our camp. Over the two week period she grew to love her Arctic world of discovery. Where in America can we still experience this kind of wilderness?

We need wilderness for future generations, whether they choose to visit the area or to just read about it. We need an Arctic wilderness to unravel ourselves from the grind of civilization, to get back in touch with our natural surroundings.

This is my first trip to the northeast coast. We need wilderness because we have places like New York. I took my daughter for a walk in Central Park and the first thing we noticed was a sign on a tree that said "Caution...Rat Poisoning." The sounds of the city were almost deafening to us. Through the night I tried to sleep through the big hum of civilization, the roaring sirens, and the incessant honking. We could barely see the sky trapped between the towering skyscrapers.

Oil is increasingly becoming a scarce commodity. Sooner or later we will have to make advances in our technology and use alternative sources of energy. Sooner or later we will have to enact a national energy conservation policy. While oil is cheap we can get away with higher speed limits and bigger engines in our cars. But it is foolish. We are only kidding ourselves to believe that the Arctic Refuge will solve our foreign oil import dependency. Extracting oil from the refuge will merely give us a drop in the world's oil bucket and some short term oil industry profits.

The clock is ticking and you, as senators, should have some vision and foresight on this issue. Energy conservation works. There are other alternative forms of energy and new technology that can meet our long term energy needs. When the oil runs out we will be forced to turn to other options. When a wilderness area disappears from our shrinking planet there are no alternatives. Man cannot make more wilderness once it is used up.

* * *

I would briefly like to address some of the points made in Senator Murkowski's bill, S. 1217. Perhaps some of this information has not been brought to your attention.

Section 2, (b) states that production from the Prudhoe Bay oil fields on Alaska's North Slope, which now constitutes over 20 per centum of the

Nation's total domestic crude oil production, will begin to decline rapidly in 1988;

I believe this is a false assumption for the following reasons;

1) Several so-called "marginal" fields have yet to become fully produced such as Endicott, Lisbourne, Milne Point, and West Sak. West Sak potentially has a greater recoverable reserve than Prudhoe Bay, approximately 20 billion barrels. When the price of oil goes up, and as new technology develops, this field may prove to be a major producing field. How can we possibly consider opening the refuge when we know that there is a 20 billion barrel reserve sitting next to Prudhoe, with the infrastructure already in place?

2) I urge the committee to review the State of Alaska's five year oil and gas leasing plan. The State plans to lease 13.5 million acres of onshore lands in the Prudhoe Bay area over the next five years. These lands are located near the Kaparuk River Unit and the North Slope foothills. Most of these potentially leased lands are classified as having moderate potential. Who's to say that there won't be another major field discovered? When Prudhoe Bay was discovered the industry had no idea that they would later discover the Kaparuk Field, the second largest producing field in America.

3) In addition to the state onshore lands coming up for lease, there are millions of acres of offshore lands yet to be explored.

How can we justify opening our only Arctic Refuge when there are so many other exploration options? The refuge is not the last hope for the North Slope. The assumption that crude production will decline rapidly in 1988 may be false based on existing and yet to be discovered reserves in the Prudhoe area, coupled with more advanced recovery techniques, ie. horizonal drilling. S. 1217 is based on what I feel is a very weak assumption.

Section 2. (e) "the results of eighteen years of operations at Prudhoe Bay provide compelling evidence that carefully planned and executed oil and gas exploration, development, production, and transportation on the public lands is compatible with the North Slope's fish and wildlife resources.."

You have heard from the Environmental Protection Agency and the Alaska Department of Environmental Conservation. The Prudhoe Bay area has not been adequately monitored for the last 18 years. The State of Alaska has only recently monitored development and production activities. Studies have shown that reserve pits have leaked drilling mud contaminants into adjacent tundra ponds, killing aquatic organisms. The U.S. Fish and Wildlife Service began its first study on the effects of drilling mud contaminants on birds in the Prudhoe Bay area this summer. The lab tests have yet to be developed. We have had 18 years of development at Prudhoe but we know virtually nothing about the long term effects of heavy metals and hydrocarbons on waterfowl.

Two million birds migrate to the coastal plain to nest, feed and stage. How can we in good conscience risk contaminating the birthplace of so many Arctic species with hazardous wastes?

I strongly recommend that you do not pass S.1217 out of committee and that the committee support HR 39 which would so rightly designate the coastal plain wilderness. It deserves nothing less.

The **Chairman**. Thank you very much, Ms. Miller. And thank you also for making that report available to us.[1] We will very carefully study that. We will query the Fish and Wildlife Service and also Mr. Herrera and others about it.

I might say that my kids are past the tinker toy stage, but I do have a dog which on occasion is not house-broken. So, I get your point. [Laughter.]

Senator **Murkowski**. Mr. Chairman, I have children too. Only mine were I think in the jack stage. I do recall moving across the living room floor in my bare feet and stepping on jacks on occasion. I understand the comparison that the witness is making. I don't necessarily agree that it is a valid comparison, but it is certainly a comparison.

The **Chairman**. Finally, we are pleased to welcome a distinguished environmentalist at the forefront of the environment and conservation movement in this country for many years. And we are very honored to have Mr. David Brower with us. Mr. Brower.

STATEMENT OF DAVID R. BROWER, SIERRA CLUB DIRECTOR AND CHAIRMAN, EARTH ISLAND INSTITUTE

Mr. **Brower**. Thank you, Mr. Chairman. I appreciate the opportunity to be here particularly to share what I have been from my co-panelists.

Old mountaineers never die. They rarely fade away. But when there were still a lot of high places still to reach on this planet, I got to a good many of them. And in World War II I had the chance to teach thousands of men how to get to high places in combat.

The **Chairman**. Bring the microphone a little bit closer.

Mr. **Brower**. And then 35 years ago, I made my first attempt on Capitol Hill. [Laughter.]

And I have been coming back quite often since then sometimes successfully—rarely successfully, often with failure. And I have premonitions that this may be my last attempt on Capitol Hill. So, I hope you will forebear my comments here when I say some things you may like to hear now. I hope that you will like them better after you have the chance to digest them.

I am speaking as the Chairman of the Earth Island Institute. But I am drawing from experience that goes beyond that, and is primarily I think from the Sierra Club where I have held various offices in the Sierra Club since 1933 except for a brief hiatus after I was asked to resign as executive director in 1969. My successor as the executive director of the Sierra Club is Mike McCloskey to whom James Watt said not too long ago we are going to fix things you can't unfix. And I am afraid the legislation in its present form is exactly part of the Watt plan.

While serving as executive director, I had the opportunity to help persuade Secretary of the Interior Fred Seaton convince President Eisenhower to establish the Arctic Wildlife Range by proclamation. I well remember the resistance to that proclamation by an assistant secretary, Ted Stevens—resistance overcome in the last days of the Eisenhower Administration by Clinton Pink Gutermuth.

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[1] The report was retained in committee files.

Day after day as the President's last day grew closer, the proposal was stalled. Then Pink in his own way came into the Secretary's office like a storm out of the Gulf of Alaska starting gently and building into a rage. In final exasperation he said in no uncertain terms, "All I want to say, Mr. Secretary, is are you just sweet-talking us, or are we going to get this damned wildlife range proclaimed by the President." Anyone who knew Pink Gutermuth then would know that it was easier to proclaim a refuge than to face the fury of a Gutermuth gale.

Thanks in no small part to Pink, the proclamation was issued and has been celebrated often, as it should be. It was President Eisenhower's greatest conservation achievement.

I wasn't at that meeting, but I ran this by Pink Gutermuth last night. He is home for chemotherapy, and he said that was correct.

Starting in 1950 with articles I helped publish in the Sierra Club bulletin, we got the Sierra Club's interest going again. And it started with John Muir in his travels to Alaska. He founded the club long ago.

But then my duty came in about 1952. It was my duty to round up at the North American Wildlife and Conservation conferences those people that are coming from Alaska or those non-Alaskans who cared about Alaska to meet about the Arctic Wildlife Range and Ira Gabrielson's command post at these conferences.

We all got our duties assigned to us, and then we would go on for another year and repeat until we finally got it. Then the thing was to get Canada to reserve the porcupine caribou herd range on its side of the border. And there Sig Olson was the most devoted activist.

Now, the shoe is on the other foot. Canada is doing its part, but the United States is waffling.

We all knew about the naval petroleum reserve, but not about the forthcoming pressure to exploit it for civilian use rather than to protect the caribou or the oil security mission. The United States had not yet perfected its now apparent determination to blow our vanishing resources of petroleum, key to so many future needs, out of industry's tall stacks and everybody's tail pipes instead of treating it as a reserve. We do not fully appreciate the coming urge not to lock up, but to use up this resource and thus deny it to future Americans and their security.

We had felt comfortable. Oil in Alaska seemed remote enough to be safe. Then came the discovery of Prudhoe Bay. I had just become executive director of the John Muir Institute then, and we had received a generous contribution from Robert O. Anderson of Atlantic Richfield. These helped pay my salary and financed an important environmental conference at the Aspen Institute in 1969. John Ehrlichman attended to represent the Nixon Administration, and for the first time he then heard about the greenhouse effect.

Just two days ago Secretary Hodel and I heard the City of San Francisco engineer point out that in the last 10 years the Pacific Ocean has risen 6 inches. That is a very ominous figure. Scientists said at the turn of the century that we wouldn't have a problem with the greenhouse effect due to our use of energy for 1,000 years.

I was founder and president of Friends of the Earth as well. And we soon joined in a suit to hold up the Alaska pipeline. You will recall Atlantic Richfield's interest in that pipeline. Our suit strained Bob Anderson's sense of humor, and he gave us no further grants. I suggested later to Thornton Bradshaw when he was president of ARCO that he should give Friends of the Earth a big grant because we had held up the pipeline long enough that the oil price went way up, and they made lots more money than they would have made if we hadn't got in the way. [Laughter.]

And we still don't have that grant and need it.

The value of Alaska's oil will still rise by orders of magnitude if you spare it.

You may also recall that our suit was won in court but lost in Congress. Vice President Spiro Agnew broke the tie vote in the Senate. This opened Alaska to a brief period of great wealth and to the subsequent hard times we were predicting.

Spiro Agnew also by breaking the tie reduced a great native culture that had been self-reliant for millennia to one the heritage of which may have been irretrievably eroded by a flash-in-the-pan flush of oil revenue.

Congress also let taps be weakened at that point and let taps go ahead without the NEPA protection. And this is one of the things that I think is going to end up with enormous cost that you have heard something about now—a huge cost.

I also shared a program twice with Secretary Hickel. I had opposed his nomination for the Sierra Club, but these times we agreed. First, we agreed that President Nixon was wrong on Viet Nam.

We agreed also that the oil pipeline should have been a railroad and a railroad for several reasons. Access could be controlled on a railroad, not on a haul road. For another, a railroad would not spill as much oil as a pipeline could in a bad case scenario. For a third, a railroad would have a fourth of the pipeline's capacity. And the Prudhoe Bay oil would have been a boon to Alaska's economy four times as long for nearly a century instead of two decades or so.

There was a fourth reason that we didn't discuss. A railroad would lead directly to the North American market by a secure route, and would avoid a sea route that was not only perilous, but that also could easily end up in Japan—source of the pipe in the first place. You have all heard of the renewed interest in selling Alaska oil to Japan to help our trade balance if not our energy security. I wonder why we torture logic this way.

Now, history can be dull. And perhaps what I have been reciting to my audience if not to me. But one thing is axiomatic. If we do not learn from history, we are doomed to repeat it. I am paraphrasing a good authority on that.

Let me quote here what is attributed to me in the National Aquarium even though I don't remember when I wrote it. It's the quote: "We have not inherited the earth from our fathers, we are borrowing it from our children." This line also appears on the jacket of Lester Brown's important book, "Building a Sustainable Society." It pinpoints what I think is the most important duty of this committee in dealing with this legislation.

If you borrow something with the intent of returning it or paying the loan back, that is ethical. If you have no intent to pay it back or can't, then it is a form of stealing, which is supposed to be illegal. We cannot put used oil back. We cannot borrow it. We can steal it from America's future.

Professor Charles Park, whom I encountered in John McPhee's book, Encounters with the Archdruid, told me that if this generation takes care of itself, the next generation can take care of itself. He also told that to one of my Stanford classes I asked him to speak to. Although the class was polite to him, they did not buy that line. I have yet to encounter any audience that buys the idea that our obligation to the next generation is to take care of ourselves, then leave waving goodbye and saying lots of luck, kids. How many people here are urging you to do just that? We should stop stealing from children.

I am afraid that this is exactly what the legislation portends, and I therefore do not think you should approve it as presented here. In its present form there are too many important goals that the legislation cannot meet.

It cannot provide security for the caribou, as I think the caribou would let you know if they cared to speak.

It will not sustain the concept of preserving wilderness in perpetuity, a concept this Nation has led much of the world to accept and should not abandon now, especially for a trivial pursuit.

It is not capable of adding one iota to our national security, not unless you believe in strength through exhaustion that the faster we find and use up the resources that are to sustain our future, the stronger we shall be. This seems to have been our national energy policy for the past several administrations, including this one. And I think it is time to understand that every resource we exhaust strengthens our opponent, not us.

It fails to encourage the quest for a sustainable society, which is the only society that can conceivably be secure for more than the present moment. A sustainable society must depend upon renewable resources which oil cannot be. It must recycle nonrenewable resources, and burned oil cannot be recycled. It needs to restore the base of renewable resources, our forests, soils, cities and human minds. In this effort, America needs to lead. We are in retreat.

There is oil off our shores and some within our shores, but not a great deal of it anymore. It is frontier oil and expensive to develop and rapidly reaching the point where it will take more energy to get the oil to the people than the people will get out of the oil. We should use our generation's share and no more than our share of the oil that remains for services that oil renders best. We know that it is a building block for many things far more useful to us than automobile and stack exhaust. It can build things that do not lead to acid rain, to the ominous warming of the atmosphere and to the thinning of the ozone barrier we all depend on. As we use our share of oil, we should invest in ways to replace its energy. We don't. The ways exist, and this administration ignores them.

If we give a damn about our children and theirs—and I am sure we all do—we will not deprive them of necessities in order to pamper ourselves with conveniences, nor will we wish to deprive them of the opportunity to now a world as beautiful as ours with ample space in it for the coming fellow passengers on this remarkable spaceship we travel on, including space for caribou.

Yes, we need oil, but a lot less than we think. According to Professor Bartlett at the University of Colorado, if we were to reduce our use of oil a mere 1 percent per year, it would last forever. Of course, the day before forever, we would be down to the last molecule, but we need not worry about that yet.

Our present technology will enable to reduce our per capita use of to far less than half of what it now is, something we know from the experience of such backward places as England, Sweden and West Germany and New York City as well. Their per capita use is half ours. They are cutting their use, and we can assume that they are doing that in the interest of building a sustainable society in their countries. We should be capable of doing better. And I urge you to require it.

In my own 50 years' experience in the environmental movement, I have seen most of the environmental damage and our stealing from children that has turned me gray has come either from the mad dash for more energy or thoughtless ways with which we waste what we find.

"Trend is not destiny," Rene Dubos said. If we keep following our present trend, we will indeed end up where we are headed, but that need not be our destiny. This Nation has been steadily losing its former excellence in education, nutrition, public health, transportation, housing, technology, manufacturing and world leadership. Too much of our talent is being directed to an arms race that no one can win. Our best efforts should be aimed not at eroding the American dream, but in restoring it.

We need oil, but not this oil, not in our lifetime. We need energy conservation. We are not achieving it. We have abandoned the progressive steps that we were making toward it. Energy efficiency and energy alternatives have been starved of support by this administration. Please, gentlemen, reverse this national retrogression.

North slope oil will eventually be needed. Americans a few centuries hence may need it desperately. We surely do not. I hope that they will have perfected ways of getting it carefully, which we don't, of using it sparingly for its highest purposes, which we also don't, of cleaning up after themselves as we have not, and that they will restore the earth for the people and creatures who called it home before our industry intruded.

And I would urge, moreover, that the U.S. Senate, no matter what party controls it, not imperil one of the finest pieces of legislation produced in the Nixon Administration, the National Environmental Policy Act. That act of global importance is becoming an endangered species here and we cannot afford to weaken it further. We ourselves are strong enough to meet its modest requirement that we look carefully before we leap. The Congress ought not to preclude the opportunity for enough people to have their chance to look before they are shoved into a leap they don't need and may very well not survive.

Well, Mr. Chairman, I hope you will accept for the committee files the following books that I have had a hand in publishing. And the first one, Earth and the Great Weather—it was written by our son Kenneth—describes what was in the Prudhoe Bay area before the oil discovery. He was one of the last non-natives to cross the Brooks Range and to go there. And I have a foreword there that I think is quite relevant to what I am saying to you here.

Then I also have Cry Crisis—a little book that the Friends of the Earth put out—Rehearsal in Alaska. And there I think you will be impressed with Kenneth Brower's words going on with the photographs up front, and the bad and good prophecy of my own extended foreword.

Then I have three books here by Amory Lovins that I think should be looked at by people here who have particular interest in what you want to do with this legislation, which I think probably is to let it twist in the wind. But the main point is that if we are going to keep NEPA for its value, then anything that goes into this legislation should make sure that NEPA is strengthened, that it continues alternatives not for just now but far into the future, alternative schedules of using our resources, not just alternative momentary alternatives.

I think probably we ought to rely on horse's judgment, that yes, you can go into the Arctic Wildlife Range for oil provided you do not disturb a blade of tundra.

But the Amory Lovins' books I would say just a few things about that he has made a major—he, Amory Lovins—made a major contribution to global security, including our own security. His genius would serve our own energy security if this administration would stop ignoring it. The energy and war book describes a connection we should sever quickly, the connection between nuclear weapons and nuclear power. And the Brittle Power shows how enormously vulnerable this country is to disturbance from within of our energy arteries.

He has created something this committee should be well aware of in its search for energy. Our greatest opportunity for oil conservation—and Joe Fisher mentioned this—lies in overcoming the intransigence of Detroit and other manufacturing centers that insist on squandering with inertial tendencies the nonrenewable energy that provided this Nation much of its strength. They thus hasten the energy's exhaustion and our own. Energy not wasted foolishly is available for sensible use. Americans concerned about the future will not blow it away.

And in conclusion, at long last, if, Mr. Chairman, the Arctic National Wildlife Range must yield its oil, please give a later generation a chance to make or defer that decision. We are not ordained to deny them that right. Join us in hoping that the people in dire need of oil then will have a sustainable national energy policy, that they will be exquisitely careful in how they take and use that oil, and that all the people between now and then, the people who will be brief tenants on that planet, will have an unspoiled Arctic National Wildlife Range for themselves as part of what Wallace Stegner has identified as the "geography of hope."

Thank you, Mr. Chairman.

[The prepared statement of Mr. Brower follows:]

THE ARCTIC NATIONAL WILDLIFE RANGE
AND NATIONAL ENERGY POLICY

Statement before the Committee on Energy
and Natural Resources, United States Senate

October 15, 1987

by David R. Brower
Sierra Club Director
(Executive Director, 1952-1969)
Chairman, Earth Island Institute

DAVID R BROWER, 40 STEVENSON AVE BERKELEY CA [illegible] (415 [illegible]

THE ARCTIC NATIONAL WILDLIFE RANGE
AND NATIONAL ENERGY POLICY

Testimony of David R. Brower

Mr. Chairman, members of the committee, and staff:

Thank you for the opportunity to appear here to make what suggestions I can about the Arctic National Wildlife Range and the proposed use of its oil resources. For my remarks I am drawing upon my experience with several organizations, but particularly with the Sierra Club, in which I have held various offices since 1933, except for a brief hiatus after I was asked to resign as executive director in 1969.

While serving in that office I had the opportunity to help persuade Secretary of the Interior Fred A. Seaton convince President Eisenhower to establish the Arctic Wildlife Range by proclamation. I well remember the resistance to that proclamation by an Assistant Secretary--resistance overcome in the last days of the Eisenhower administration by Clinton R. (Pink) Gutermuth. Day after day, as the President's last day grew closer, the proposal was being stalled. Then Pink, in his own way, came into the Secretary's office like a major storm from the Gulf of Alaska, starting gently and building into a rage. In final exasperation, he said in no uncertain terms, "All I want to say, Mr. Secretary, is Are you just sweet-talking us, or are we going to get this damned wildlife range proclaimed by the President?" Anyone who knew Pink Gutermuth then would know that it was easier to proclaim a refuge than to face the fury of a Gutermuth gale. Thanks in no small part to Pink, the proclamation was issued, and has been celebrated often, as it should be. It was President Eisenhower's greatest conservation achievement.

Starting in 1950 with articles I helped to publish in the Sierra Club Bulletin (which I then edited), the club's interest in The Great Land was rennewed with an article and a series of photographs by Ansel Adams, followed with articles by Lowell Sumner and Starker Leopold, with skilled oversight by George Collins, of the National Park Service.

It was natural for the club to be involved because its founder, John Muir, became concerned after his own travels in Alaska decades ago. Long before I had traveled there myself I accepted appointment as ringleader of the Arctic refuge proposal for many years at the annual North American Wildlife and Conservation Conferences. It was my duty to round up those attending from Alaska together with unAlaskans who cared for Alaska to join sessions which Ira Gabrielson, the Mr. Conservation of his day, held in his conference command post. New assignments were made in behalf of the refuge for the ensuing year. Once the refuge had been proclaimed, the next item on the agenda was to persuade Canada to preserve the Porcupine caribou herd range, on its side of the border. The most devoted activist in this was Sigurd Olson. Now the shoe is on the other foot. Canada is doing its part, and the United States is waffling.

We all knew then about the Naval Petroleum Reserve and the strong pressure to exploit it for civilian use rather than protect the caribou or the oil's defense mission. The United States had not yet perfected its determination to blow the vanishing resource of petroleum, key to so many future needs, out of industry's tall stacks and everybody's tailpipes, instead of treating it as a reserve. We did not fully appreciate the coming urge, not to lock up, but to use up this resource and thus deny it to future Americans

We had felt reasonably secure. Oil in Alaska seemed remote enough to be safe. Then came the discovery at Prudhoe Bay. I had just become executive director of the John Muir Institute for Environmental Studies, which had received generous contributions from Robert O. Anderson's (of Atlantic Richfield) foundation totaling $80,000. These helped pay my salary and financed an important environmental conference at the Aspen Institute in 1969. John Ehrlichman attended to represent the Nixon administration.

I was founder and president of Friends of the Earth as well. FOE was soon to join The Wilderness Society, the Environmental Defense Fund, and the Center for Law and Social Policy in a suit to require the proposed Alaska pipeline to meet the requirements of the National Environmental Policy Act.

You will recall Atlantic Richfield's interest in that pipeline. Our suit strained Bob Anderson's sense of humor and no further grants came our way. Years later I suggested to Thornton Bradshaw, then president of ARCO, that we were entitled to a major grant, thanks to the huge increase in oil revenue ARCO enjoyed because we had held up the pipeline long enough for the oil to sell at far more than ARCO had expected. FOE still deserves such a grant.

You may also recall that we won our suit in court but lost it in Congress. Vice-President Spiro Agnew broke the tie vote in the Senate. This opened Alaska to a brief period of great wealth and to the subsequent hard times we were predicting. He also, by breaking the tie, reduced a great culture that had theretofore been self-reliant to one the heritage of which may have been irretrievably eroded by a temporary flush of oil revenue.

Secretary of the Interior Walter Hickel (whose confirmation I had opposed in the club's behalf) and I shared a platform twice shortly after our loss, and both times we agreed. The first time he had made himself unpopular with President Nixon by his opposition to the undeclared war in Viet Nam. The second time he agreed that an oil railroad would have been preferable to an oil pipeline. For one thing, access could be controlled on a railroad, but not on a haul road. For another, a railroad could not spill as much oil as a pipeline could in a bad-case scenario. For a third, a railroad would have about one-fourth of a pipeline's capacity--the oil would have been a boon to Alaska's economy four times as long--for nearly a century instead or two decades or so.

There was a fourth reason that we didn't discuss. A railroad would lead directly to the North American market by a secure route, and avoid a sea route that was not only perilous, but that also could easily end up in Japan--source of the pipe in the first place. You have all heard the renewed interest in selling Alaska oil to Japan to help our trade balance, if not our energy security.

History can be dull, and perhaps what I have been reciting is dull to my audience if not to me. But one thing is axiomatic. If we do not learn from history, we are doomed to repeat it (I am paraphrasing a good authority). I should quote here what is attributed to me in the National Acquarium, even though I don't remember when I wrote it: "We have not inherited the earth from our fathers, we are borrowing it from our children." This line also appears on the jacket of Lester Brown's important book, "Building a Sustainable Society." It underlines what I think is the most important duty of this committee in dealing with this legislation.

If you borrow something with the intent of returning it or paying the loan back, that is ethical. If you have no intent to pay it back, or can't, then it is a form of stealing, which is supposed to be illegal. Professor Charles Park, whom I encountered in John McPhee's book, "Encounters with the Archdruid," said that if this generation takes care of itself, the next generation can take care of its own self. He told that to one of the Stanford classes I taught and asked him to speak to. Although the class was polite to him, they did not buy that line. I have yet to encounter any audience that buys the idea that our obligation to the next generation is to take care of ourselves, then leave, waving goodby and saying, "Lot's of luck, kids." We should stop stealing from children.

I am afraid, however, that this is exactly what this legislation portends and I therefore do not think you should approve it as presented here. In its present form there are too many important goals that the legislation cannot meet:

1) It cannot provide security for the caribou, as I think the caribou would let you know if they cared to speak. This reminds me of Voltaire's line: "Mankind was given the art of speech so that his thoughts could be hidden." I am trying not to hide mine, and wish I were able to think like a caribou.

2) It will not sustain the concept of preserving wilderness in perpetuity, a concept this nation has led much of the world to accept, and should not abandon now, especially for a trivial

pursuit.

3) It is not capable of adding one iota to our national security, unless you believe in Strength Through Exhaustion--that the faster we find and use up the resources that are to sustain our future, the stronger we will be. This seems to have been our national energy policy for the past several administrations and I think it is time to face the fact that every resource we exhaust strengthens our opponent, not us.

4) It fails to encourage the essential search for the elements of a sustainable society, which is the only society that can conceivably be secure for more than the present moment. A sustainable society must depend upon renewable resources, and burned oil cannot be recycled. It must recycle nonrenewable resources, which oil cannot be. It needs to restore the base of renewable resources--our forests, soils, and human minds--an effort this nation needs to lead in. We are in retreat.

There is oil off our shores and some within our shores, but not a great deal of it. It is frontier oil, very expensive to develop, and rapidly reaching the point where it will take more energy to get the oil to the people than the people will get out of the oil. We should use our generation's share of what oil remains for services that oil renders best. We know that it is a building block for many things far more useful to us than automobile and stack exhaust. It can build things that do not lead to acid rain, the ominous warming of the atmosphere, and the thinning of the ozone barrier we all depend upon. As we use our share of oil, we should invest in ways to replace its energy. The ways exists, and this administration ignores them.

If we give a damn about our children and theirs, and I am sure we all do, we will not deprive them of necessities in order to pamper ourselves with conveniences. Nor will we wish to deprive them of the opportunity to know a world as beautiful as ours, with ample space in it for the fellow passengers on this remarkable spaceship we travel together on--including space for caribou.

Yes, we need oil, but a lot less than we think. According to Professor Bartlett, of the University of Colorado, if we were to reduce our use of oil a mere one per cent per year, it would last forever. The day before forever we would be down to the last molecule, but we need not worry about that. Our present technology will enable us to reduce our per-capita use of energy to far less than half of what it now is--something we know from the experience of such backward places as England, Sweden, and West Germany (and New York City as well). They are cutting their per capita use and we can assume that they are doing so in the interest of building a sustainable society in their countries. We should be capable of doing better, and I urge that we do. In my own fifty years' experience in the environmental movement, I have seen that most the the environmental damage that has turned me gray has come either from the mad dash for more energy or the thoughtless ways with which we have wasted what we found.

"Trend is not destiny," Rene Dubos said. If we keep following our present trend, we will indeed end up where we are headed, but that needd not be our destiny. This nation has been steadily losing its former excellence in education, nutrition, public health, transportation, housing, technology, manufacturing, and world leadership. Too much of our talent is being devoted to an arms race that no one can win. Our best efforts should be aimed not at eroding the American Dream, but in restoring it.

We need oil, but not this oil, not in our lifetime. We need energy conservation, but we are not achieving it. We have abandoned the progressive steps we were making toward it. Energy efficiency and energy alternatives have been starved of support by this administrations.

North Slope oil will eventually be needed. Americans a few centuries hence may need it desperately and we surely do not. I hope that they will have perfected ways of getting it carefully, which we don't. using it sparingly for its highest purpose, which we also don't, and cleaning up after themselves as we have not, and that they will restore the earth for the people and creatures who called it home before industry intruded.

Moreover, I would urge that a Senate controlled by the Democratic Party not imperil one of the finest pieces of legislation produced in the Nixon administration--the National Environmental Policy Act. That act is becoming an endangered species, and we cannot afford to weaken it further. We ourselves are strong enough to meet its modest requirement that we look carefully before we leap--and that the Congress not preclude the opportunity for enough people to have their chance to look before being shoved into a leap they don't need and may very well not survive.

I should like to submit for the committee files the following books that I have had a hand in publishing:

"Earth and the Great Weather: The Brooks Range," written by our son Kenneth Brower. He was one of the last of the nonnatives to cross the Brooks Range to an unspoiled North Slope. My foreword to that book supplements my statement here.

"Cry Crisis: Rehearsal in Alaska," by Washington conservationist Harvey Manning. I would call your particular attention to kenneth's text accompanying the opening photographs, and to the good and bad prophecy in my extended foreword.

"World Energy Strategies," "Soft Energy Paths," and "Brittle Power" are books by Amory Lovins, who has made a major contribution to global energy security. His genius would serve our own energy security if this administration would stop ignoring it. "Brittle Power" shows how extremely vulnerable this nation is to

severing from within of its energy arteries. Amory Lovins has demonstrated something this committee ought to be aware of in its search for energy: Our greatest opportunity for oil conservation lies in overcoming the intransigence of Detroit and other manufacturing centers that insist on squandering, with their inertial tendencies, the nonrenewable energy that provided this nation much of its strength, thus hastening its exhaustion and our own. Energy not wasted foolishly is available for sensible use.

"Our Common Future" is the report of the Brundtland Commission established by the United Nations and chaired by one of the world's most capable women, Gro Harlem Brundtland, Prime Minister of Norway. The Commission devoted nearly three years to the study of environment and development around the world. The report has been all but ignored by the Reagan Administration. The report shows clearly how essential it is for the industrial nations to change their ways swiftly if civilization as we know it is to be sustained. I recommend that the members and staff consider "Our Common Future" carefully and revise the current legislation accordingly.

"The Meaning of Wilderness to Science" contains the proceedings of the Sierra Club's Seventh Biennial Wilderness Conference, held in San Francisco in 1959, in cooperation with many organizations. The book has long been out of print., so I cannot provide a copy. I do include the section on Alaska that led to the Sierra Club's major effort to save what became the Arctic National Wildlife Range. We had initially hoped that the area would be designated a national park. That is what our own "Plains of Serengeti" deserve.

If, Mr. Chairman, the Arctic National Wildlife Range must yield its oil, give a later generation a chance to make that decision. We are not ordained to deny them that right. Join us in hoping that the people in dire need of oil then will have a sustainable national energy policy, that they will be exquisitely careful in how they take and use that oil; and that all people between now and then will have an unspoiled Arctic National Wildlife Range as part of what Wallace Stegner has called their Geography of Hope.

APPENDIX I

From "Earth and the Great Weather: The
Brooks Range," by Kenneth Brower
(Friends of the Earth, 1971)

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foreword by David Brower
introduction by John P. Milton

photographs by Pete Martin, Wilbur Mills,
John P. Milton, Gilbert Staender, and others

with selections from Lois Crisler, Robert Marshall, Nalungiaq,
Netsit, Knud Rasmussen, David Roberts,
Vilhjálmur Stefansson, Tatilgak, and others

by Kenneth Brower

THE BROOKS RANGE

FRIENDS OF THE EARTH ○ SAN FRANCISCO • NEW YORK • PARIS
Published by the McCall Publishing Company, New York

Foreword

HEADED toward the Pole on the direct route from Copenhagen to Anchorage, we watched the sun set for the first time that day at four in the afternoon and flew north into night. The captain announced our estimated time of arrival and I divided the distance by the hours and wrote on the airline map the times we would pass over principal points of interest. The map bore historical notes about the famous explorers and the successive dates on which their various expeditions got nearer and nearer the point from which everything else on earth was south. Before the light was gone on the last bleak land passing seven miles below us, a strong feeling of admiration for the explorers welled within me. For a quickly passing moment I wished I could have been there with them then.

I remembered my first polar-route flight, made memorable by what I was reading as I traveled across Greenland's icy mountains, over Baffin Island and its own great mountains, then across Hudson's Bay with a sweeping view north, whenever the cloud cover permitted, of the last great wilderness in North America. Loren Eiseley's *The Immense Journey* and the brilliance of his narrative of man's encounter with time alternated with the brilliance, out the starboard window, of the north country where man had looked hard at the limiting cold and had broken through that limit with his wits and his spirit.

But now I was reading what *The Economist* had to say about oil exploration in the Arctic and, once in that mood, began clipping what *The Times*, *The Observer*, and the *Financial Times* were saying about oil spills to add to my extensive collection on what tanker pilots didn't know about staying afloat. I was happy to have the stewardess change the subject by offering me a cocktail. Long before dinner it had got quite dark, and as we sped about nine miles per minute above the scene of arduous exploring long ago, I put on my headset and the movie began.

What the movie was I don't remember, because my headset was already off. I had glanced at my watch, saw that it was time to look below for the lights of Spitzbergen, and there they were. Far more diverting was the light in the sky, a display of the aurora borealis. My first view of an aurora was in 1939, when I saw it from the Sierra Nevada. In 1955 I saw one from Ellensburg, Washington; Kenneth Brower, then eleven, would not believe it was an aurora. For fifteen years I never saw it again. But here was a bold white light arched broadly over us, changing to a thin profile as we flew beneath its arch. There were not many passengers, so I could switch from port to starboard windows at will and did often, fascinated by the phenomenon. No one else seemed aware of it except a Japanese opposite me who kept his head to the window, a pillow alongside to exclude extraneous light. We exchanged glances of appreciation. "Isn't the captain going to announce this display?" I asked the stewardess, still excited by what I had seen only twice before in fifty-eight years. "No," she said, "the passengers would be annoyed to have the movie interrupted."

Later she woke those who wished to know when we were directly over the North Pole and I looked out again. The aurora was gone. The clouds concealing the Arctic Ocean were lit only by starlight. As dawn broke in the south, the cloud cover thinned and strange patterns emerged, a lacework of new leads and old in the ice pack. Ice patterns changed to polygons; permafrost was under the snow and our crossing of the Arctic Ocean was over. An airstrip showed faintly. Prudhoe Bay, I thought, but we passed too high and fast for me to spot landmarks I had seen there on the ground two months before, when the tundra world was green and the oil companies were showing conservationists their Prudhoe camp. We had learned about drilling pads, berms, life below zero, the care and feeding of tundra, the search for exotic grasses to heal scars. An Eskimo antilitter crew was out on the nearby tundra with big plastic bags. We learned that the oil company's ecologist thought caribou liked the pads and berms and would not be disturbed in their migration by the above-ground portions of the 800-mile proposed pipeline. We could marvel at the technology that allowed man to find oil in this icy desert and bring it to the surface. It was rather frightening to stand on a platform partway up a rig and watch an expert team slap pipe into the ground in a bit-changing operation. The rig, tower, platform, cables, winch drums, and engine shuddered and shrieked in violent surges and smashing stops that seemed about to tear the place apart. I resolved not to use gasoline again if it took this much trouble to get it.

If the technology for getting at the oil and bringing it to the surface was impressive, the technology for getting it to market was not. Looking at the miles of four-foot Japanese pipe piled on site, I worried about the rush to get it there before enough was known about whether it would work or whether, if it worked, the Alaskan environment could keep on working within range of it. I worried about the determination to get the oil out and used up fast, about the stubborn refusal to understand the long-term consequences of short-time exploitation.

I was worrying all over again now as our North Pole flight sped us toward the Brooks Range. I conjured up disjointed paragraphs of a letter I would send, were I Chairman of the Board of Atlantic Richfield or of British Petroleum, chief developers of Arctic Slope oil, to my directors and stockholders. It would explain how the company, out of corporate responsibility, must pause for breath in its dash for oil until a whole series of facts were in that were not yet available to anyone. The pause would cost everybody money; but if it were a pause that would help people live longer, part of the cost ought to be recoverable. The company was leading in a more rational approach to keeping the planet a tolerable one than corporations had previously thought necessary. The company did not think that the environmental crisis was a figment. Would the stockholders therefore be helpful and patient with the corporation in its deliberate choice to forego profits that might risk the environment excessively. And would stockholders who sincerely felt that costs to the corporation were more important than costs to the earth please sell their stock to someone who felt differently. A professional worrier could conceive the letter. But could a chairman send it, or a stockholder like it?

Alpenglow was now lighting the summits of the Brooks Range. Whether it was dawn or twilight, it would not reach the North Slope for months yet. Ahead, the sun broke the world's rim to the south of us and climbed feebly into a flaming sky as we flew over the tapestry of meanders of the Yukon. Shortly past Mount McKinley we started letting down. Ten hours out of Copenhagen we landed in Anchorage at two in the afternoon, two hours before we had departed Denmark, and half an hour later the sun set in the south for the second time that day; night came again and stayed this time. The show was over.

Crossing several meridians at jet speed is always upsetting. Being benighted twice in one day was more than my sidereal clock could handle. Another kind of double twilight, however, was far more disturbing, the twilight for exploration and for wilderness. The speed and ease of my travel took the exploration out of it and off the planet. I could ask, as Aldo Leopold did, "Of what avail are forty freedoms without a blank spot on the map?" The early explorers had earned a chance to see the blank spots of the far north but my fellow passengers and I had not. We could select from eight stereo channels as we looked down at where the blank spots had been.

Concurrently twilight was descending on wilderness. Just three years before my flights, Kenneth Brower, John Milton, and Steve Pearson were soaking up the Brooks Range wilderness experience that *Earth and the Great Weather* has much to say about. Three people had only themselves to depend upon, no source of resupply, unknown mountains, nameless valleys, rivers of stone, seas of grass, the ultimate wilderness. In three short years the oil stampede had put a civilized stamp on an area the size of Massachusetts in the remotest part of the North Slope. The civilizing had only begun to run its course. There is tension in the fabric of wilderness and when it is cut it withdraws fast and far. The 800-mile pipeline, cut across the ultimate wilderness, was to be the second civilizing step in a series of no one could predict how many more steps. Already Ken, John, and Steve were deprived of knowing again the wildness they had known. Their route had lost the beyondness that counted very much. Where would their sons look for a chance to know wildness. "To be precious, the heritage of wilderness must be open only to those who can earn it again for themselves," Garrett Hardin has said. "The rest, since they cannot gain the genuine treasure by their own efforts, must relinquish the shadow of it." He quotes Goethe's "We must earn again for ourselves what we have inherited."

Earn it where? In whatever vestige of wilderness is left after this generation of brief tenants has glutted itself on conveniences, including a plethora of energy, no matter what it costs all who are to follow? Do the oil seekers and users intend to leave anything unspoiled? The extractors, seemingly the most efficient international organization yet put together, plan to double their all-time drain in the next decade, and to do so come what may and from wherever it may—the Arctic, western Pacific, continental shelf off Southeast Asia, the Middle East, South America, Algeria, the Gulf, Santa Barbara. The possibility of slowing the mad race, and of sparing a resource six hundred million years in the making and 60 years in the using, and of using it for purposes oil alone can serve, seems not to have entered any system of government's mind.

The oil people, finders and users, are the primary targets here because they are best organized of all in the unintended war to eradicate wilderness from the earth. They have plenty of company. Surely they must be on the verge of sensing that a planet too well oiled will, like a cormorant, die. Or are they? "The connection between the ability of civilization to protect wildness and the ability of civilization to survive is not so tenuous as we might wish," I said twelve years ago. "The kind of thinking that motivates the grab for what's left at the bottom of the barrel—the pitiful fragment of resources in the remaining wilderness—is the kind of thinking that has lost this country friends it cannot afford to lose." I said this at the North American Wildlife Conference in New York City. Between then and now mankind has used up as much oil as in all the preceeding years, and the United States has gone far toward losing every friend it had. No one is proposing to send us another statue at the moment. And in March 1971 another North American Wildlife Conference, in Portland, was hearing an industry-dominated panel argue long, oblivious to alternative routes and schedules for development, that the oil should be hurried to market across the last great wilderness within U.S. borders and also across some of the most seismically active terrain within those borders or anyone else's. The oil-company representatives on the panel echoed the view of the Department of the Interior in its draft statement about the impact of North Slope oil development upon the environment: yes, there would probably be some damage, but demands for energy required forging ahead. National security would somehow be served. How depletion would serve national security was not explained; one who would strengthen the nation by using up its oil, a Friends of the Earth advertisement suggested, would probably burn his firewood before winter.

And when the final depletion comes, what kind of ghosts do we want in the Arctic or Northwest Passage ecosystems—still one of the greatest wildernesses on the planet? Voicing the concern of fellow Eskimos, "spirited pure lovers of that land who depend upon that land for a living," Willy Willoya puts a more cogent question: "When will the Caucasions let us rest and live peacefully? Where is the god they worship, when they destroy all our human rights and privileges? Where is the liberty and justice they proclaim to the entire world? Where are the wise, the strong and the brave amongst the Americans who would be good to their brothers and their lands? And to the creatures and the islands and the waters and the meadows and the tundra and the caves and the mountains that are our home?"

Wilderness, in the days of popular concern about total environment and degradation, has had too quiet a voice speaking in its behalf. Pollution has been easier to herald because its impact is in nostrils, eyes, and genes everywhere. If what wilderness we have left is to serve its highest purpose—being there for itself and its indigenous life forms, being there as the outside to a world that is otherwise a cage, being there for its wholeness, its beauty, its truth—then those who understand it must speak again as lucidly and as persuasively as did Aldo Leopold, Robert Marshall, and Howard Zahnizer. Nancy Newhall, put it beautifully thirteen years ago: "Wilderness holds answers to questions man has not yet learned how to ask." Physicists are peculiarly mindful of natural law and one of them, J. H. Rush, made the point just as tellingly: "When man obliterates wilderness, he repudiates the evolutionary force that put him on this planet. In a deeply terrifying sense, man is on his own." With no answers to the questions he would one day be wise enough to pose.

With no further effort at all, by merely letting our present momentum sweep us on with it, we can grind through the world's last wilderness by 1984 at the latest. Just the undisciplined dash for energy can by itself obliterate wilderness. So dash on then, find the energy, and spend it! But what to do for an encore? The recoverable fossil fuels will be gone. The feasible damsites will all have been built upon and will before too long be silted in. We will have run out of ways—once we find any—to dilute atomic waste from fission and will realize that fusion is better left in Pandora's box, remembering what came out last time we opened it. We will have endangered the oxygen sink of the atmosphere by probing the earth's fossil fires in geothermal experimentation. So we will use less energy, not more. We will return to ways of getting by with the energy the sun gives us each day instead of exploding and spilling our way through the energy capital the earth took four billion years to acquire.

Do we return to those ways while the world still has wilderness in it, or do we postpone the inevitable turning until we have severed outright and irrevocably those unbroken living connections to the beginning of life that the wilderness has so far preserved? Do we really want to repudiate the evolutionary force? These are questions a rational man should not have much trouble answering if he paused to think them through.

Charles Burnham warned against making little plans; they lack the power, he said, to inspire men's admiration or support. So why not a big plan? Blessed as we are with more data than were ever collected before, and confronted with an improving technology that might better serve us than direct us, we should prepare a plan not for a decade or a century, but a bolder plan to last a millenium, with option to renew.

A big, long-ranging plan of that order could lead to self-fulfilling predictions that are agreeable instead of the kind we have been getting lately. At a time when we see too many things wrong on the land and going wrong in the sea, why not contemplate a thousand good years instead of concocting sedatives for 1984?

Unconventional though the thought may be, the United States could make it clear that we should like to see international leadership rotate peacefully a few times in the course of this thousand years. Such a relaxed attitude might give mankind, and the other mutually dependent creatures in the environment man is part of, a better chance at the succeeding thousand-year period. Perhaps we should not plan for a period beyond that, even though bristlecone pines do.

It is not the example of the bristlecone, however, that suggests a plan of this magnitude. It is the nuclear dilemma, the strange, self-centered behavior that allows us to deposit high-level radioactive waste (a term from the AEC's Honeybucket Glossary) in the global ecosystem, waste that some one hundred billion future men must take meticulous care of in order that a multitude of us today may enjoy our own brief pass at the planet with all the conveniences we are accustomed to. This waste is the dirtiest garbage of all. Forgetting its thermal pollution ("enrichment") for the moment, we know it is mutagenic, teratogenic, and damnably long-lived. We have already produced a great deal of it and this productivity is proliferating while we watch—or better, while we read ads calling it clean and look the other way. Our children must know where we left it and keep away. So must theirs, and *theirs*, by oral tradition if all others means fail. All this for at least a thousand years, with no fail-safe technique devised yet for the warehousing, no one putting up bond, no one prepared to write the insurance, no long-lasting Directions for Survivors chiseled in stone tablets, but with plenty of people willing to sell and install the machinery and merchandise the electrical power, and with all hands in the first, second, and third worlds eager to buy it without limit and without asking what it really costs.

The least we can do, if morality and ethics are still in our fiber, is to plan a thousand years of amenities for our progeny while they mind our nuclear garbage.

So a thousand good years, and an aim. Mere survival is not enough in the world we seek. Our institutions need to accommodate an optimistic vision of man's future, to believe that if the golden rule is all right in religions, it should not be avoided in life.

A thousand-year plan for oil, with particular respect to the immediate foreground in Alaska, would recognize the contribution of those who discovered the North Slope oil resource, appropriately cover the costs they cannot cover, reward them, pay the state for storage underground, then record the oil reserve as part of the inventory to be budgeted to last a thousand years. The Plan would contemplate that oil may one day serve a more important purpose than fueling automobiles and supersonic transports. Precipitate exploitation would be discouraged and extravagant use would be prohibited. Studies of potential dangers of removing and transporting the oil in and across fragile ecosystems would be exhaustive and not an exercise in salvage ecology. The costs of perfecting spill-proof transportation would be met and development would await the meeting, the oil remaining safely stored underground until then, *in situ*. Whatever the costs were would be passed on to the user, who has always paid the costs anyway although he has not always known it. If this materially raises the price, that increase in itself would make economically feasible the development of more efficient oil-using devices. We would pollute far less because pollution would be too wasteful and too expensive. This would be a residual advantage and a welcome one, since the Plan would not only expect oil to be available for a millenium, but also would expect the air to remain breatheable for the duration.

Applied to people, the Plan would celebrate and hold hard to the diversity that makes them strong, beautiful, and interesting.

Applied to land use it would obliterate laissez-faire.

In forestry, it would eradicate monoculture.

In agriculture, it would stop decimating organic diversity three billion years in the making.

It would recognize that if population continues to grow at the present rate, mankind will outweigh the earth and there are better things to do with both.

Applied to pace, the Plan would encourage people to slow down and live, to take time to look for the real show, heeding Robinson Jeffers:

But look how noble the world is,
The lonely-flowing waters, the secret-keeping stones,
The flowing sky.

No one ought to have too little courage to try, for what is the alternative? Begun soon, the Thousand-Year Plan should have rewards along the way. It should keep alive an orchestration of living things more beautiful than we now know, and perhaps even more beautiful than any of us remembers.

Any of us, that is, except those who have known what Kenneth Brower and his friends remember in what this book has to say. There is a bit of requiem in it already, and we can be grateful that it is a beautiful requiem. We are more grateful that the world still has most of this ultimate wilderness still living, and there lies within man the power to let it stay that way.

DAVID R. BROWER

Berkeley, California
March 25, 1971

APPENDIX II

From Cry Crisis: Rehearsal in Alaska,
by Harvey Manning (Friends of the
Earth, 1974)

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Cry Crisis!

REHEARSAL IN ALASKA

By Harvey Manning

with chapters by Kenneth Brower

foreword by David R. Brower

edited by Hugh Nash

FRIENDS OF THE EARTH
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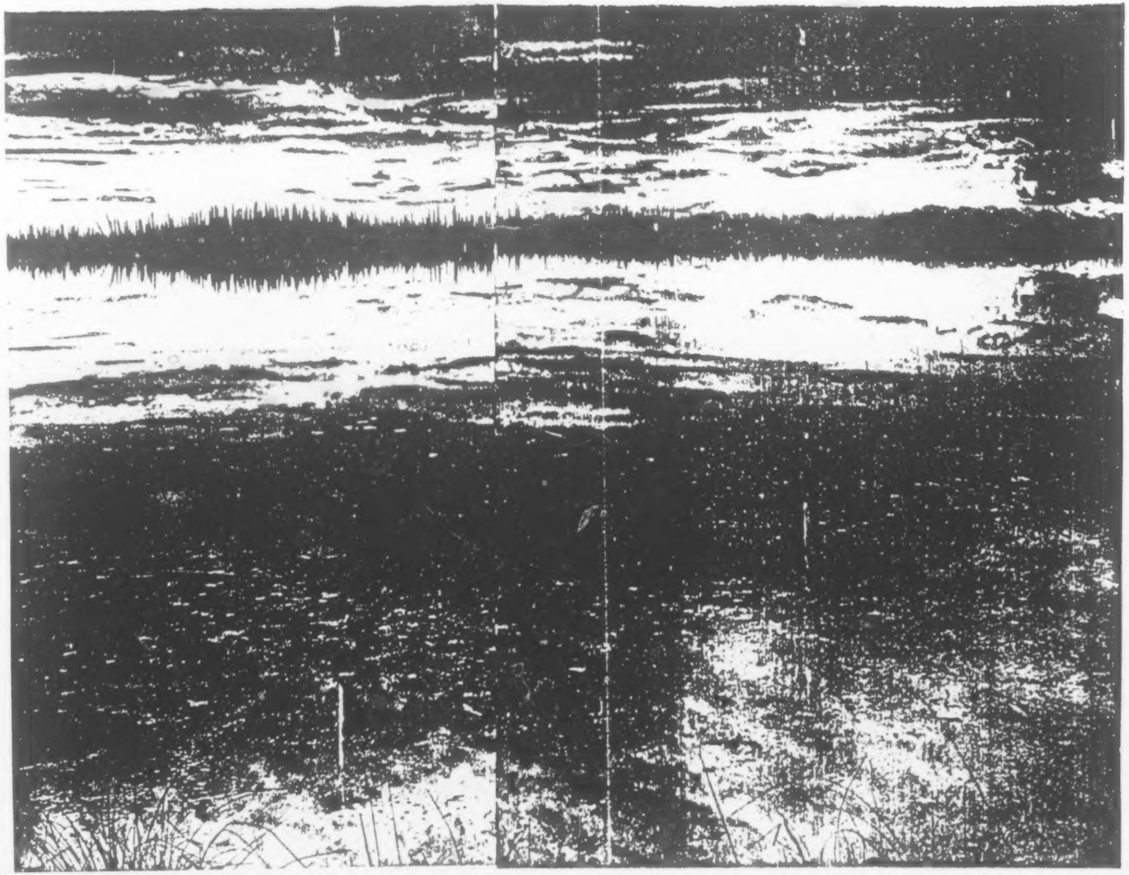
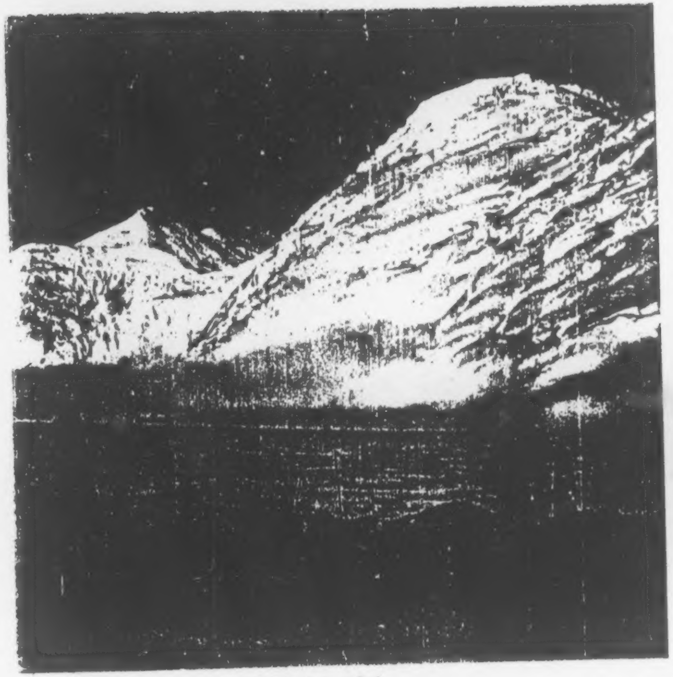


PETE MARTIN   Approaching autumn storm, Tetlin Lake

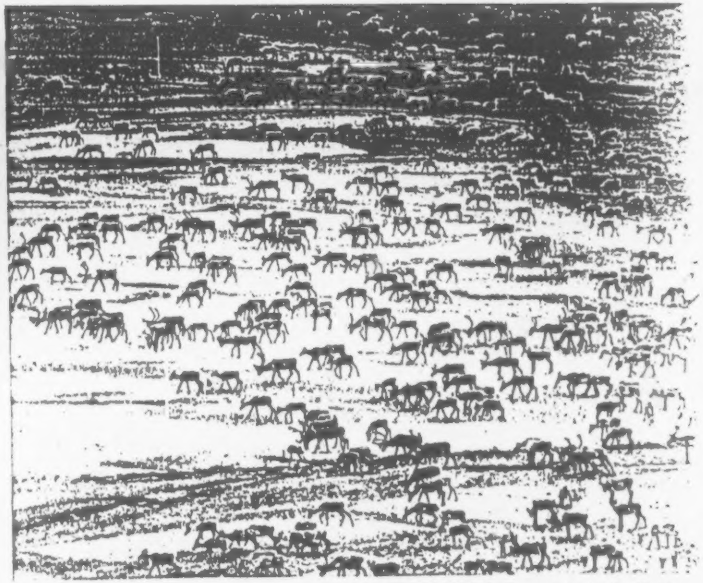
The heart of Alaska holds our last great wilderness



ED COOPER: Camp at 10,000 feet, McKinley National Park

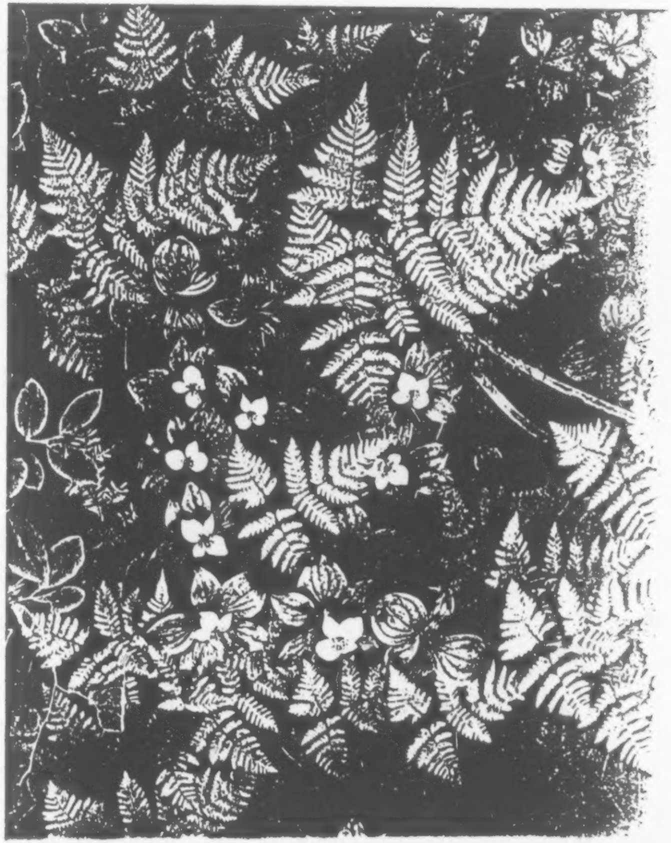
Its peaks are our Himalaya

Its plains are our Serengeti



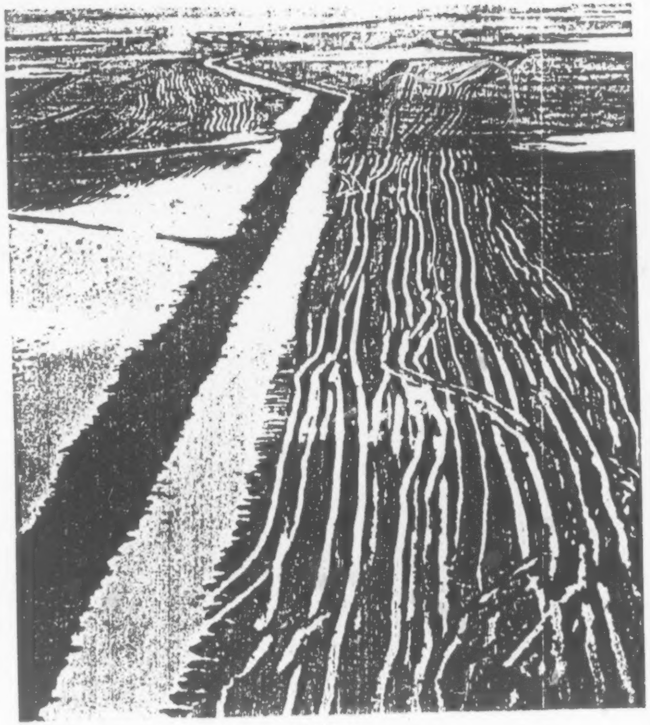
CHARLIE OTT: Caribou migration, interior Alaska

[illegible]
to questions we are too dull as yet to ask;
a reservoir of potential; a terrain fertile of possibilities,
where man has not yet begun reducing the diversity
and the mystery of what God put here in His subtler wisdom

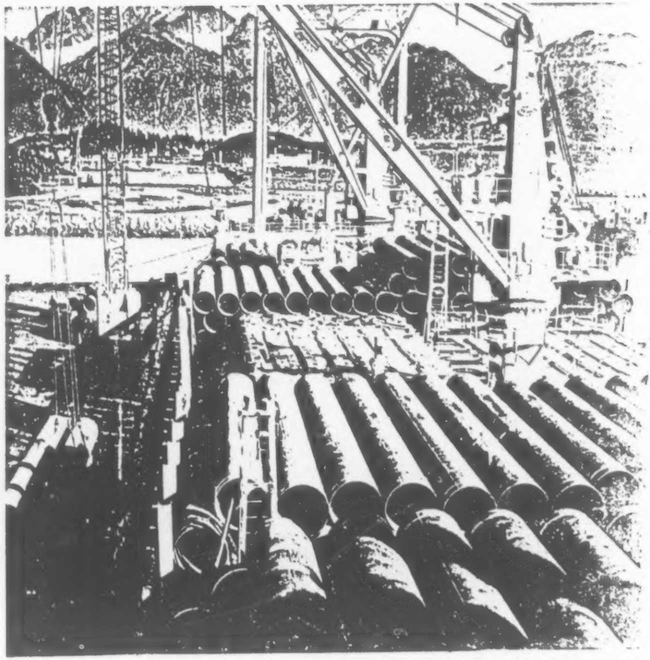


WILBUR MILLS: *Barren-ground grizzly, North Slope*

It is our final frontier: the last piece of this nation's soil
where a walker can lose himself in distances
and in the vastness of his horizons;
the last place where the prehuman inhabitants, the land's animals,
can live and die without knowing the smell of man.
It is a roomy refuge for the human spirit in a crowded age of cities.
It is the blankest spot on our map;
the widest unmarked tract in our geography of hope.

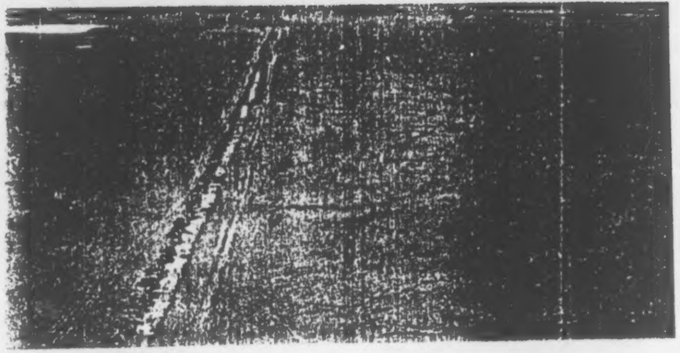


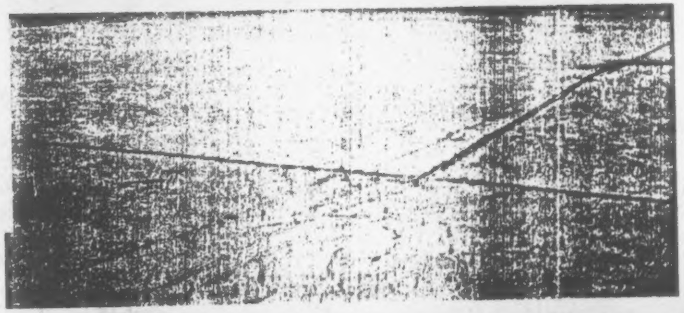
ANCHORAGE DAILY NEWS: The Hickel Highway

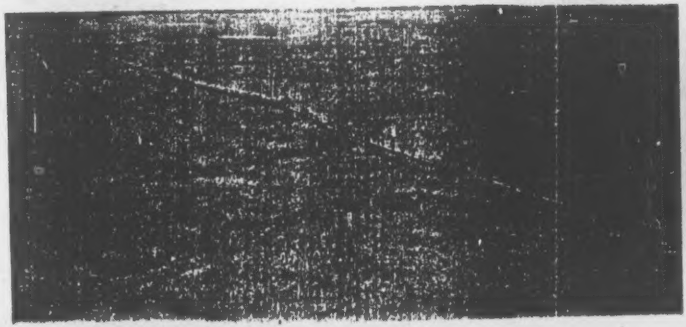


ANCHORAGE DAILY NEWS Unloading pipe at Valdez

It is in imminent danger.
The proposed trans-Alaska oil pipeline would thread through its center, in a
narrow corridor, yes, but as fatal to wildness as a sliver through a heart.
The pipeline would breach wild Alaska, would "open it up."
The line's maintenance road would ramify. With time
the adventitious roads would multiply and connect, like ice crystals on a
[illegible]

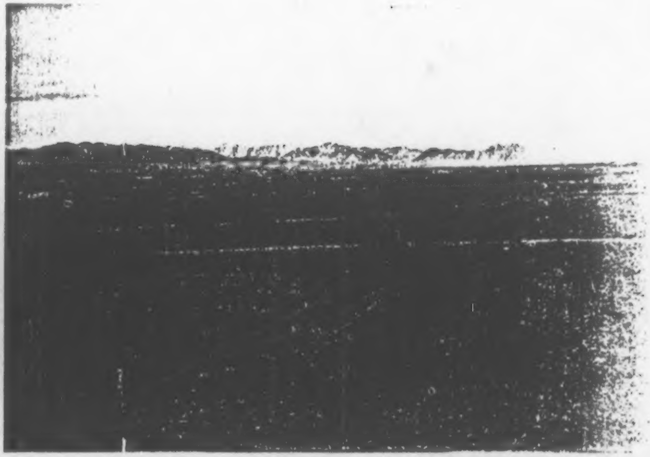




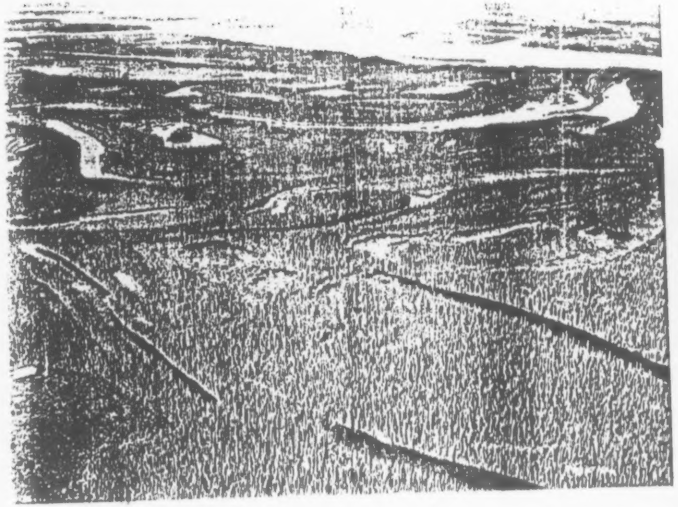


A loss becomes tragic when it is unnecessary.
The Alaska pipeline is that; the wrong way to deliver oil to the wrong place.
A trans-Alaska route benefits neither Alaskans nor the rest of the American public.
It profits no one but the oil companies.

The injury would be mostly to an idea.
Those who care about wildness would have lost the big one;
their efforts for Alaska would become less spirited,
their minor victories would taste of defeat.
It is the difference between defending a virgin and a whore.



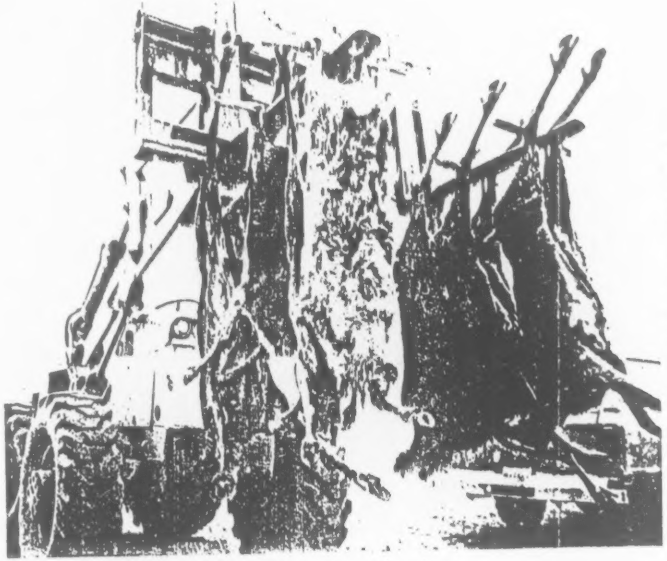
BUREAU OF SPORTS, FISH AND WILDLIFE: Tundra scars



We are free, of course, to repeat our old mistakes. We can do so;
and when the oil is gone, and the oil barons have pulled out,
we will have exchanged something rare for something we know too well

We will have given in again to our old habit: the conversion
of the varied wealth of Earth into just more human protoplasm

GEORGE HALL: Los Angeles

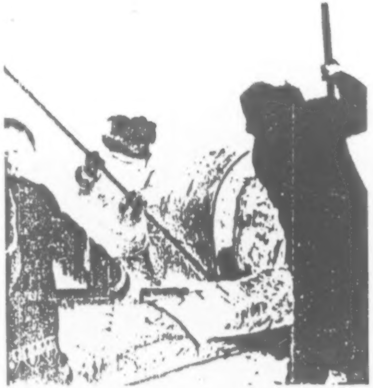


ROBERT BELOUS: *Caribou carcasses and forklift, North Slope oil camp*

WILBUR MILLS *Caribou*

The caribou will have departed
for wherever it is that the buffalo went

RICK NEWTON: Whale flensing, Point Barrow

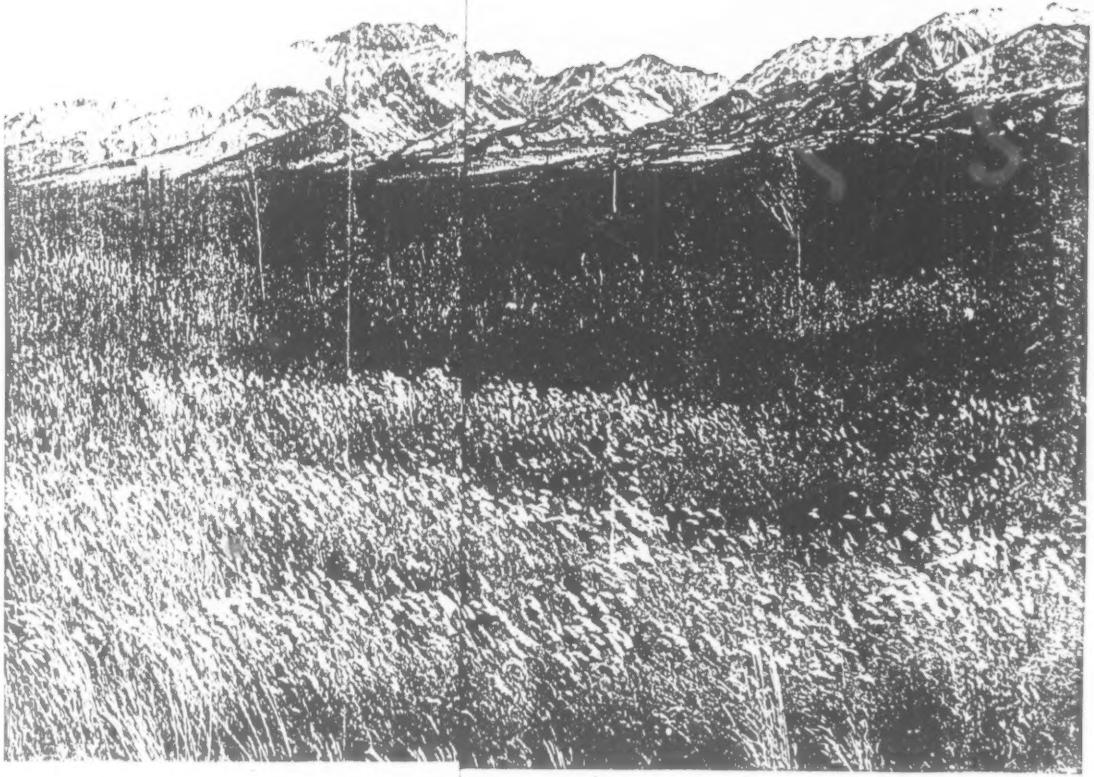


The six-thousand-year old tradition
of one of Earth's great hunting peoples
will become just a memory

ELIHU BLOTNICK: Fourth Avenue, Anchorage

—a rambling tale told by grandfathers,
poignant, dimly recalling something fine

PHILIP HYDE: Native children, Arctic Village



PETE MARTIN On the pipeline route between Delta and Fairbanks.

And we will all be immeasurably poorer.

Foreword

Cry Crisis! probes a contrived crisis and stresses the real one. It tries not to be any more excited about what confronts America than Paul Revere was. Revere's role, vital though it was, is no more important than what needs to be done now. We would like *Cry Crisis!* to energize a battalion of Paul Reveres.

The energy shortage the nation is now being exposed to is, we believe, a contrived crisis designed to benefit a few. The real crisis lies largely in our failure to see where the true crisis lies.

Is it possible reasonably to conclude that the energy "crisis" just happened? We don't think so.

No international effort, the United Nations included, is more competent or better organized and financed than that which the oil-energy complex puts into action. The complex collectively monopolizes energy (except for solar and tidal capabilities and a few remaining forests), and energy is a major component of the world's principal currencies. The energy people know where the energy is, and in what quantities. They have computer programs, growth rates, demand rates, and discovery rates down cold. They know where and when they want to move capital. Theirs is not a world they will be surprised in, but it is a world full of surprises for us. In 1973 they were hardselling oil in Europe while talking conservation to us. They can play wells and tank cars and storage tanks and tankers and refineries and pipelines like a console.

Evidence of their contriving is circumstantial, and is likely to remain so. It is naive to wait for some revelatory memo or tape (the Chairman of the Board of ARCO, an interviewer once wrote, carries no pencil with him to meetings; the caution and secrecy with which oil-industry deliberations are carried out is legendary). But the circumstantial evidence is compelling.

The energy crisis comes at a time of stiffening public resistance to offshore drilling, hurried oil-shale leasing, and reckless stripmining. It comes at a time of growing public unease over the rush to open up one nuclear Pandora's box after another, a time of growing doubt over industry's pretense that nuclear power is clean and safe, when it is neither now, or is it ever likely to be, safe enough. It comes just as long-fought-for pollution controls have finally been achieved, and it has already begun to eviscerate them. It comes at exactly the right moment to panic Congress into approving the Alaska pipeline and hamstringing the court's right to review the action.

The energy crisis has served big industry both as a vehicle for putting independent operators out of business, and as an armored car for attacking environmentalists. The environmentalists have long argued that the earth is a finite earth, that it imposes limits on growth, that there are severe penalties if we exceed the limits very long. They were the first group to predict energy shortages, and are now being blamed for them. The execution of the bearer of bad news is an old rite with modern applications: if the ringing of an alarm system bothers you, the energy crisis has rediscovered, then call the ringers extremists, or doomsayers, or Cassandras, or even alarmists and try to rip the system out. The crisis serves still another function moving an unprecedented amount of capital into energy-cartel control.

In short, if the energy crisis was not designed by the oil energy complex, it certainly has been very profitable for them in a number of ways. If they did not dream it up, they should have.

Far from really trying to get people to use less of a vanishing resource, the energy people are lobbying for supertankers, superports, and a frightfully hazardous liquefied-natural-gas transport combination that will use energy faster. They want enough electricity for two Americas by 1984. They have not lifted a finger to end the SST program, which, were it operating as Mr. Nixon planned, would have required the equivalent of five new Prudhoe Bay discoveries by the year 2000, all to provide for the slight reduction in overall travel time that the plane would allow supersonic travelers. They have been tentative at best about influencing Detroit to be less wasteful of oil. They have been of no consequence in the effort to divert highway trust funds to good purpose, such as investing them in mass transit systems that would move people and freight safely and well with far less energy.

While talking about shortages and conservation, they flare one half the world's emerging natural gas at the well.

In September 1970, a show me tour of the North Slope conducted for conservationists by the industry left many unconvinced. In Anchorage at the tour's conclusion, Phillip Berry, president of the Sierra Club, asked the president of Atlantic Richfield, "Isn't it possible for you in the oil industry to join the conservationists in persuading the public to stop its extravagant use of oil?"

"That's not our business," Thornton Bradshaw replied.

It is oil company business now, we are asked to believe — not by their deeds but by their ads.

The energy-crisis ploy seems to have begun following the Year of the Environment, 1970-71, when President Nixon said that environmental reform must come now or never." The energy industry saw their development and marketing customs were endangered. They could buy enormous amounts of advertising and, with it, buy the influence over editorial content that advertising-dependent media cannot resist and still survive. They could stage events, a requisite of sophisticated public relations.

On June 26, 1972, under the head "ENERGY CRISIS! THE INDUSTRY'S FRIGHT CAMPAIGN," Robert Sherrill asked in *The Nation*:

"....Where did the energy crisis come from? To a large extent, it came out of the hats of the oil and gas industry's propagandists. Some are more candid than others in peddling their message, none more so than Wilbur Cross, senior editor on the publicity staff of Continental Oil Company....

"Conoco was willing to go all the way, wrote Cross. 'We'll even do typing, editing, and proofing for you, if you like! And in certain instances we'll arrange transportation' on Conoco planes that happen to be going in the right direction. This ingenious proposal was first disclosed by Morton Mintz in *The Washington Post*....

"Among the 'background texts, outlines, and subject ideas that we have been developing,' said Cross, was, you guessed it, the energy crisis."

It wasn't the time, however, to launch the array of "crisis" cover stories yet. But when the United States Supreme Court refused to review the environmentalists' lower-court victory blocking the Alaska pipeline, the industry was ready. Necessary legislation was drafted an the pressure to pass it began to build. A mild crisis occurred. Gasoline ran short at the pumps as the vote in the House neared. Stories hostile to the Canadian alternative appeared and stories friendly to it could not find space. The gentle ARCO ads pointing out how good the environment was made way for a strident full pager in the *Washington Post* when it was time for the vote on an amendment requiring prompt study of the Canadian route. The Canadian alternative is not a substitute, the ad said. We need both pipelines. Let's get on with it!

The amendment was defeated and gasoline was back at the pumps. Aside from a few independent station operators who were forced to close, few suffered.

Noting well that the way to a man's heart was through his gas tank or a threat to his job, and with vaster battlegrounds than Alaska before it, the energy industry broadened its campaign.

The Explorers Club, with oil-company presidents and other explorers for energy prominent in its membership, sent out invitations June 15 to an "Energy Crisis Dinner" to be held November 28 5 months later — in the Grand Ballroom of the Waldorf Astoria, the invitees to be addressed by the President of Exxon, by Vice-President Agnew, and Jules Bergmann. Before the oil crisis developed, Mr. Agnew had one of his own.

But the plaster of the crisis had not hardened yet, even though a Middle East crisis was in the wind. On September 20 *The New York Times* said:

> ARAB ROLE DENIED IN OIL SHORTAGE
>
> "The energy difficulties of the United States are not the result of any Arab oil squeeze," at least up to now, John Lichtblau, head of the Petroleum Industry Research Foundation, said yesterday. "For one thing, our dependence on Arab oil is very small."

That was a calm voice from industry. William E. Simon was still calm in the *Times* on October 15:

> U.S. CAN GET BY WITHOUT ARAB OIL, WASHINGTON SAYS
>
> The government released figures today showing that the United

> States could get along without Arab oil in the event of a cut-off of supplies due to the Arab-Israeli war.
>
> The figures showed that the United States import about 1.1 million barrels a day of oil direct from the Arab countries. This is about 6 percent of the total daily consumption of 17 million barrels a day.
>
> William E. Simon, chairman of the President's Oil Policy Committee, said that the United States could reduce consumption by as much as three million barrels a day if it was willing to make the effort....
>
> In addition to imports of oil from the Arab countries, the United States also imports about 2.7 million barrels a day from the Caribbean and Latin America and 1.1 million barrels a day from Canada.

All the Arab oil did not stop coming when the Yom Kippur war broke out — indeed, many were to wonder how much really stopped coming, what with two sets of government figures in sharp disagreement. If it had all stopped coming, that would still be but a 6 percent drop.

A mere 6 percent, however, would alarm no one. Canada supplied the U.S. more than that and could help further if asked, not ignored. But there was a new crisis. Watergate hearings and the suit by Common Cause were showing what an enormous contribution the oil companies had made to the Committee to Re-elect the President. Many of the contributions were a violation of the Corrupt Practices Act. This brought a slap on the wrist. If you have given $100,000 illegally, and the fine is only $5,000, then you have given $105,000. Who would notice the difference?

What else might be dug up? What contributions that were better camouflaged than those discovered so far? Not just for the 1972 elections, but for 1970, and 1968? What commitments did these bring, as for example, to forge ahead on the Alaska pipeline and damn the wildlife, wilderness, fisheries, Eskimos, the public, and national security? Watergate headlines were getting too much sensitive information too far out into the open. Soon the investigation might be of the Oilgate behind Watergate. Something dramatic was needed to change the headlines.

A President of the United States, with his power to command unequaled attention, could initiate a crisis of his choosing. Beef, milk, aspirin, whiskey. Couple a momentary delay in shipping schedules with a presidential announcement on all networks that a whiskey shortage is imminent, and the liquor store shelves will be clear by nightfall. William F. Buckley, Jr. described the energy crisis as our having to get by with slightly more oil than we were using in 1970.

So the less-than-six-percent drop in Arabian crude led to the announcement of crisis and the request that the public cut 15 percent. Let there be energy self-sufficiency, and let the environment come second.

Watergate embarrassment was off the front page immediately, and stayed off, with an exception of 18½ minutes.

Then, almost as if the timing were masterminded, Americans could read full-page ads galore about how great a public resource huge oil-company profits were. In magazine after magazine, they saw Exxon's eight-page, four-color protestations of the innocence of offshore drilling. On one Exxon color spread was a map entitled, THE WORLD OF KNOWN OIL RESERVES. It showed 53 percent of our oil in the Middle East, 16 percent in Africa, 15 percent in the Soviet Union and other communist countries, 5 percent in the United States including Alaska, 2 percent in Canada, and 9 percent in what's left of the world. For Exxon, the map demonstrated the need for more offshore drilling. For President Nixon too, apparently. The President and his oil-company advisors, after studying figures like those of the map, told the public in effect that, "If we can use our oil up eight or more times as fast as the Arab countries will let us use their oil up, we will be self-sufficient." For how long? Not for very, but get it all under way before anyone figures that out. Conservationists saw a contrary message in the same map, but it was not their map to attach messages to, and they could not afford a competitive map of their own.

"Oil wells die, too.... When they do, they are shut in and disappear without a trace on the landscape," said a Mobil Oil ad in 1973. Above the words was a photograph of a simple rock cairn beneath Shiprock, New Mexico. This fabulous disappearance of oil wells — this simple tombstone — would have interested the millionaire rancher from Duval County, Texas, who visited the Friends of the Earth office in San Francisco in the same year. The rancher brought with him an album full of a different kind of photograph. In it were views of abandoned oil operations, bearing the signs of Mobil and most of the major oil companies — rusting tanks and pipes, thousands of acres of rangeland destroyed by saline pollution from oil wells, poisoned cattle, some pipes still leaking oil.

The rancher explained that when the profits of the major companies drop, the majors sell to the "poor boys," the small companies who squeeze the last drops of oil out of what the majors left behind, and who can't afford to clean up the mess the big boys made. The millionaire rancher had hundreds of color photographs of the damage to his land, he had made a film of it, and he had been to court, but the damage continued. He was only a millionaire, of course, and Friends of the Earth was considerably less than that. To give Mobil-ad circulation to a different tombstone, Duval County style, ("Oil wells die too. When they do, they bleed all over the landscape"), would have required more money than either Friends of the Earth or the rancher could spare. If millionaires cannot block damage to their holdings, what chance does an Eskimo stand, or other conservationists, unable to speak loudly enough to be heard in the din raised by the industry's campaign? We foresee a problem

We would like to point out too, when industry pledges anew its intention to sell its North Slope oil in the United States, that we see a catch or two.

For example: the oilman may really believe he can manage earthquakes and tidal waves in the land that displays these phenomena in their most frequent and frightful manifestations, but does he really believe he can manipulate his stockholders as easily? Suppose a stockholder wants his company's oil to go to Japan. The oilmen have variously denied that (any) (much) or (most) of Alaska's oil is destined for Japan, however much it might seem that just such a destination was nailed down with massive and premature shipment of Japanese pipe to be stacked along the Alaska route. Japan needs outside oil far more than we, and she is conveniently close to the port of Valdez and to the heavy Japanese investment in her colonial Alaska. The Japanese proximity and the critical Japanese need for energy combine to make a most profitable market. For non-U.S. ships making an end run on the Jones Act (which requires that U.S. to U.S. marine shipments travel in U.S. bottoms), Tokyo would be a fine destination.

What happens, then, for all the oil-company denials, when shareholders of ARCO and other companies read Charles Cichetti's clear analysis, published for Resources for the Future, of how the oil companies will clear an extra dollar per barrel by shipping the oil to Japan? This means an extra profit, on the Prudhoe Bay reserve that has been proved so far, of ten billion dollars. What happens when stockholders bring suit, as they are entitled to do, to force management to realize such profit — however piously management claimed it wished to forego the profit to please its domestic customers?

And if management means what it says about using Alaska oil in the U.S., why not a stockholder's suit to require that the oil come to the real market, the Midwest, by the least expensive, least hazardous route? On the score of initial expense alone, there would be nearly a $3 billion advantage to bringing the Prudhoe reserve through Canada — using proved arctic railroad technology for the arctic portions of the route, and proved pipeline technology for the rest. Can a company afford to ignore such an economy and the resulting profit? And what about a Permanent Committee of Vigil, a cooperative effort by pro-bono stockholders and environmentalists, to check out, persuade, legislate against, or sue, everlastingly, every lapse on the part of those who unilaterally dreamed up the wrong route to the wrong place at the wrong time, if they adamantly persist in going ahead with it?

What happens when the stockholders review some of the scenarios of disaster that spring easily to mind, but were omitted from the pipeline's environmental impact statement and operating criteria? What happens when the stockholders note, and thank the environmentalists for, the $30 billion increase in value of the proved Prudhoe reserve? This increase has come from just leaving the oil in Alaska, rather than hastening to blow it out tailpipes in Japan and (or) the U.S. The price is climbing fast because oil-wise nations around the world are realizing that oil saved is a future resource earned, enhanced instead of squandered with unprecedented extravagance.

Perhaps a group of ARCO stockholders and British Petroleum shareholders might even like to suggest that their companies give the environmentalists a generous grant for sparing the companies from building an unsafe pipeline in the first place ("We didn't know how to build a safe pipeline then,'' the president of Arco has said, in thanking environmentalists for delaying construction. Now the companies know, he thinks). They might offer a 10 percent finder's fee for the addition to real capital that safe leakproof storage in the Alaskan earth has brought about. This is a real capital gain for stockholders and for their neighbors, for Alaskans, for everyone's children. The environmentalists could use such financial support. It would enable them to keep their alarm systems operating in the public interest.

Perhaps the stockholders will do so. Until then, environmentalists will have to continue, as always, the struggle in the public interest at their own expense.

When Energy Czar William Simon, on the day of his appointment, announces that a second pipeline is necessary to bring the oil out of the North Slope faster — and he did — they will insist, as loudly as they can, that he is wrong on two counts. His is not just the second pipeline. Count them: (1) Trans Alaska pipeline number one, ARCO et al. (2) Canada's proposed natural gas pipeline through Canada. (3) ARCO's proposed line across Canada, which ''would not be a substitute'' for pipeline number one. (4) El Paso Natural Gas Company's proposed natural gas line across Alaska. (5) Secretary Morton's natural gas line across the Arctic National Wildlife Range. (6) Mr. Simon's ''second'' pipeline, its purpose to hurry the North Slope oil into automobiles, generators, furnaces, and human lungs. These six do not include the Canadian alternative, which Canada was willing to share, though her willingness to do so was kept secret from Congress by the Nixon administration. Simon's pipeline, if completed, would begin the realization of the environmentalists' worst fears. From the beginning, they worried that pipeline number one was just a camel's nose in the igloo. Then more pipelines and other exploitive corridors would multiply across the Great Land.

The count so far? To date, seven pipelines proposed.

Is that all? No. On December 6, 1973, the *Wall Street Journal* told briefly of still another, and on the following day the *San Francisco Chronicle* revealed futher, and most alarming, details:

OIL MAN'S CALL TO TAP NAVY FIELDS

....Deputy Secretary of Defense William P. Clements, Jr., who has a $98 million investment in SEDCO Inc., an oil-drilling and pipeline construction company that serves the major international oil companies, has recommended in an internal Pentagon document the exploration and development of the vast Naval Petroleum Reserves, the largest untapped supply of oil in the United States.

The recommendations suggest the possibility that private oil companies could develop the Navy's vast oil fields to fulfill military needs and sell what was left over to civilians. Many of these companies are SEDCO customers.

Clements was unavailable for comment on the question of whether his recommendations constitute a conflict of interest because of his enormous personal investment in SEDCO, which is one of the largest offshore drilling companies in the world and one of the top five pipeline contracting firms in the nation...

In addition to being No. 2 man in the Pentagon, Clements is a member of President Nixon's cabinet-level Energy Emergency Group, which is formulating the administration's oil policy in the present fuel crisis and is managing the Defense Department's oil allocation program.

So Secretary Clements, then, and Secretary Morton, and Energy Czar Simon, and President Nixon; and Congress (telling to court to stay out of it), pursue the strange policy: Drain America First, and *Fast!* For self-sufficiency.

The Industry's public relations campaign has indeed been persuasive. Oil has filled the vacuum the public leaves when it disdains participating in politics. The oil industry has hedged bets in the process, contributing to both the probable loser and the probable winner, thus creating the inevitable residue of obligation in both

What the industry programmed worked very well in 1973. Rising oil-company profits — the earnings for the top nine companies skyrocketed five billion dollars in the first nine months of 1973 — demonstrated their success. The companies succeeded in enthralling the Nixon administration, keeper of facts from Congress; they called the tune in Congress, which, in its approval of the pipeline, was willing to undercut the National Environmental Policy Act, its own finest environmental achievement; they demeaned the courts, whose role in protecting the public was compromised by Congress.

In June 1973, *The New Yorker* underscored the Congressional default:

''....The second event was the vote in the Senate last week approving the construction of an oil pipeline across Alaska — a vote that the *Times* called 'a shocking display of irresponsibility.' Every member of the Senate must know that the most pernicious financial pressure group in the United States is the oil lobby.... Moreover, on the same day that the Senate cast this crucial vote, the Federal Trade Commission charged the eight largest oil companies in the United States with having conspired for more than twenty years to eliminate competition, to keep prices artificially high, and to create shortages of oil and gas.

"If the Watergate hearings have demonstrated anything, they have demonstrated the threat to the survival of our political system posed by the secret use of big money by unscrupulous people during political campaigns.... Approval of the pipeline bill by the Senate.... suggests a readiness on the part of the bill's senatorial supporters to ignore charges, made after long study by independent government agencies, about practices that are in the business world exactly what the Watergate practices were in the political world. All in all it seems that the Senate has so far learned little from the appalling scandals it has uncovered."

The irresponsible vote was a tie vote. Broken the right way, it would have preserved the hard won function of the National Environmental Policy Act and of the court. Then Vice-President Spiro T. Agnew, who had not yet been forced to resign, broke the tie, the wrong way.

The timidity of the fourth estate is the ultimate default, the ultimate demonstration of Big Oil's success. The feeling of futility abroad in the land is the measure of that success, its source and its symbol.

With this feeling pervasive, it is all too easy to imagine election time, 1976. The North Slope and other Arctic permits have been issued. The environmentalists and National Environmental Policy Act have been derated. The oil shale and stripmine and offshore leases have been lobbied through by the same technique that worked so well in Alaska. The highway lobby, truckers, and airlines have exerted their pressure and have been permitted to resume their old habits. The supersonic transport program is back out in the open where President Nixon wanted it to be when he withheld adverse information about it from Congress. Import quotas are diminished again to provide full protection of the domestic market for domestic producers. The depletion allowance has been raised. Nationalization of energy has been dismissed as radicalism. Financial page headlines read:

WATERGATE COMMITTEE MEETS AGAIN

Russell Baker, writing in the *New York Times* on December 2, 1973, saw it all more clearly:

> Here are pressing questions about the energy crisis and answers supplied by one who should know better.
>
> Q. What is the energy crisis?
>
> A. The energy crisis is the finest all-purpose alibi in America today. If you can't deliver the goods, it is because of the energy crisis. If you want to raise prices, it is necessitated by the energy crisis. If you want to cancel a visit with your wife's relatives, tell them, "Sorry, it's the energy crisis." . . . .
>
> Q. Wasn't anybody smart enough to notice until right now that we were running out of oil?
>
> A. Of course! Children of the 1930's — and they are running the government today — were aware of it. "What will happen when we have used up all the oil?" they used to say. "What a silly question!" their parents used to reply. "Before that can happen science will come up with something new to replace oil."
>
> Q. Why hasn't science come up with something new to replace oil?
>
> A. Because if it did, economic disaster would result. Oil companies would collapse. So would shipping and pipeline companies. Texas would become a disaster area and American taxpayers would have to put every sheik in Arabia on welfare. There would no longer be any reason to build the Alaska pipeline.
>
> Q. If the people running the government knew the energy crisis was coming, why didn't they stop construction years ago on the interstate highway system and use the money to build railroads?
>
> A. Because they knew the Interstate Highway System would be needed to help save gasoline when the energy crisis occurred. Without the Interstate Highways' capacity to move traffic at 70 miles an hour, it would be impossible to cut gasoline consumption by reducing the speed limit to 50 miles an hour.
>
> Q. Instead of going on daylight saving time to cut electricity usage a little at the end of the day, why not close down television after 9 o'clock so people will have to go to bed?
>
> A. If television shut down at 9 p.m., it would be the end of the 11 p.m. TV news shows all over the country. These shows are vital to fighting the energy crisis because they are often sponsored by gasoline companies whose commercials advise the audience how to cut gasoline consumption.
>
> • • •
>
> Q. I have just bought a large car which uses a gallon of gasoline every eight miles. Since the people running the government knew the energy crisis was coming, why didn't they tell the auto makers, so the auto makers wouldn't have made this car and sold it to me?
>
> A. Because the people running the government were concerned about your safety. They did not want you to take your family onto turnpikes teeming with gigantic tractor-trailers unless you were all traveling in a vehicle much sturdier than the average tiny compact....

* * *

Q. Why was the energy crisis begun at this time, just when I was finally beginning to get interested in Watergate?

A. The government reasoned that since fewer and fewer people believed anything the government said anymore it should hold the energy crisis right away while there were still a few people left to believe in it.

* * * * * *

The real crisis is in the way we persistently read the wrong message into the energy shortage that confronts us. Instead of accepting the shortage as a warning to mend our ways, we see it as a challenge to race faster down our present ruinous path. Instead of being thankful for the reprieve, we are angry at the inconvenience. We see what the bottom of the cornucopia looks like, and would rather turn away.

On November 7, 1973, in his Energy Crisis Message, President Nixon told the nation that owing to the shortage of Arab oil, its citizens must lower speeds and thermostats, and dim lights. Fine. The President has a good grasp of the kind of conservation measures that will work in the home and the family car. But then he went on to say that we must open up our oil reserves. We must put reactors on the line faster and with less care. We must revive energy research and development (these were starved of funds by the President's withholding of them and his denigration of the role of science in government). We must put a growing economy ahead of a safe environment in our thinking. We must, by 1980, become self-sufficient in energy, dependent upon no other nation (as our 6 percent of the world's population increases its present disproportionate use of one-third of the world's energy). We must attain self sufficiency by draining our own fossil fuel resources first, and at an increasing rate.

In the President's scheme for the future, the conservation measures that work for the individual will not, for some reason, work for the nation. He would have citizens march in one direction, and industry race in the opposite. That our *national* energy consumption might be made to cease growing, or even to decrease, is not, to the President's mind, one of our options.

Industry's infatuation with growth is old habit, difficult to break. But the time for overdrafts at the world's environmental bank has run out, we think, and sellers as well as buyers must realize that there will be no business at all on a dead planet.

People in Industry have been slow to see the danger, but there are intimations of change. Robert O. Anderson, chairman of the board of Atlantic Richfield (which is a client of the law firm that includes President Nixon's special counsel, fund-raiser, and bill payer, Herbert W. Kalmbach), chairman of the Aspen Institute; member of the board of Chase Manhattan Bank, the Chase Manhattan Corporation, the John F. Kennedy Center for Performing Arts, the Lovelace Foundation, Pan American World Airways, the Columbia Broadcasting System, the American Petroleum Institute, Resources for the Future, trustee of the Anderson Foundation, of the California Institute of Technology, of the University of Chicago; member of the Century Club and of the Committee for Economic Development of the National Petroleum Council; benefactor of the John Muir Institute for Environmental Studies, is one of the few men in his august set to see the threat. In 1972 FOE asked Anderson, "Cognizant as you are of the Club of Rome studies about limits to growth, cannot you and other leaders in the energy industry join in persuading the public to use less?"

"That's a tough question," Anderson answered. "I just had lunch the other day with Professor Forrester (author of *World Dynamics*) and Dennis Meadows (of *Limits to Growth*). I know a lot of people think we ought to throw their book away. I think we're going to have to live with it."

We are indeed, and because we are, more leaders of the oil energy complex should be lunching with the Forresters and the Meadowses, and letting a little of the new ethic rub off on them.

President, industry, and nation must be weaned soon from their recent dependence upon the Growth Ethic. The true message of the energy shortage, and of common sense, is that uncomfortably sooner, or inevitably and painfully later, we must redirect the growth that has let us prosper through the using up of everyone's resources.

The real crisis, then, is in the remorseless way we commit crimes against the future.

Thomas Jefferson once argued that no one generation has a right to encroach upon another generation's freedom. Today we need a new Jefferson as much as a new Paul Revere. There is a mentality abroad now that discounts children heavily and grandchildren almost totally; discounts their right to know the freedom of unspoiled places and the freedom of adequate energy. It is this same mentality that gives people of the other Americas — North, Central, South and Middle — no vote at all. This same mentality deems it somehow subhuman that Arab people might not wish to use up their oil for our purposes as fast as we wish them to.

In Alaska's future there is a potential scene that, in one form or another, haunts environmentalists.

The North Slope, 1994. A lone caribou tries to pick its way through the maze of small feeder lines, gravel pads, drilling pads, old storage tanks, oil drums, and thawed tundra quagmire, all residue of the collecting net that drained the North Slope oil quickly, in the name of national security and self sufficiency. The oil is gone, the wells have died. The "poor boys" could not afford to stay in Alaska, much less shut the wells. A mile away, on the porch of an arctic ghost town, an Eskimo man looks up from his newspaper to see the caribou against the skyline. He looks longingly after it. The Eskimo is youngish still and strong, though a little lean now, and with strangely vacant eyes. His small son sees the caribou too, and watches the animal as it makes its way through the obstacle course.

Scattered in the street below, rusting where they died, are the remains of snowmobiles. Across the street are the ruins of a filling station, with a sign posted on one of the pumps: "out of gas. Out of oil, too." The paper on the Eskimo's lap, folded neatly to a back page, is the *Fairbanks News Miner*, very thin and two months old. (The plane does not call as often as it once used to.)

The boy looks from the caribou to his father. The Eskimo feels his son's questioning eyes on him, but pretends not to. He is trying desperately to remember what he heard from old people about hunting caribou. He cannot. He is as ignorant of that as he is of driving dog teams. It's all like one of those memories of a previous life.

We must extirpate the possibility of such a scene from our future, not only for the sake of native Alaskans, but because the Eskimo in it could so easily be Everyman.

The crisis-contrivers may indeed have talked the gods of resources, the Big Banker in the Sky, into making one more loan. If so, it is secured by the unborn, who have no votes now but will soon bear the costs, with few resources to cash in and none to squander. To them, the unborn, it will seem that we did indeed burn books to get light, burn furniture to run air conditioners, and burn houses to warm ourselves. For a while, they perceive, it worked. We did multiply and subdue the earth.

As they credit us for all this, they must face the fact that the earth is not theirs to subdue, but theirs — and only in part theirs — to cherish. They will know what we began to profess: there is only one earth, and it had been beautiful. With no wildness left on it to inform them, they must go back where we ravaged their world, and bind up the wounds we inflicted. Each of them must use his or her head as we are not yet using ours, or the Four Horsemen will ride. They are saddling up now.

This is the real crisis — a crisis we foist on our children unless we can be mature enough to shoulder our share. Old, tired, me-first thinking won't do it. There is still time for the contrivers in America to come up with a better answer before the irreparable harm starts. It will cost them a lot to move back from the brink they are hurling us toward. It will cost us all too much if we let them take us over it. We need to help each other, however late we all are, in finding an alternative future our children can live in, and in it be proud of the parents they remember.

DAVID R. BROWER
Friends of the Earth

Berkeley, California
January 30, 1974

"*Cry Crisis! Rehearsal in Alaska* is a vitally important case study of Government by Oil. It is published to help prevent repeating the Alaskan disaster elsewhere, and may even yet help rescue Alaska from the Texans of this world."

—David R. Brower, President, FOE

ALASKA SCENARIO: THAT WINTER OF 1977-78

The first of several of the planned trans-Alaska pipelines is now completed and two million barrels of hot oil (at 160° F) pour through it daily. Outside the temperature is minus 70°. If the oil itself were 32°, to avoid threat to permafrost and ecosystem, 100,000 more horsepower would be needed at the pumps. But the oil is hot, and those horses are not in the system or anywhere near.

An earthquake strikes, rougher than the one that in 1964 almost destroyed Valdez, at the pipeline's tanker terminus in the stormy, tidal-wave-prone Gulf of Alaska.

"We will have delicate instruments to report on such events," the engineers had said. They were right. The instruments report disaster.

There is a dense ice fog and no way to get to the manual cut-off valves. The pumping stations are the only accessible control. They average 65 miles apart, with enough oil in the pipe between pairs of pumps to equal 130 Santa Barbara spill disasters. A torrent of oil is loose such as all the forces of evolution never wished upon a major ecosystem in all the earth's history.

Before the break can be repaired, hundreds of miles of piped oil in the undamaged line become quiet, very cold, and unmitigatedly viscous.

How are the engineers to move the oil again? What system, undisclosed, do they have in mind? Where did they test it, under what conditions, and at what cost? Did it work? Will it work now, or must they wait for summer's sunshine?

"That is a good question," a geologist said. "I keep asking it, but I don't get any answers."

What are you going to do, Mr. Secretary, except regret that Big Oil put the pressure on the President and you to move too quickly, no matter what and how long lasting the environmental cost?

—Adapted from *Cry Crisis!*

APPENDIX III

From "The Meaning of Wilderness to
Science," David R. Brower, editor
(Sierra Club, 1960

The Meaning of Wilderness to Science

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FOREWORD

Six Biennial Wilderness Conferences have been held in the San Francisco Bay region since 1949 under the sponsorship of the Sierra Club. They began with the idea of hearing out the views of various users and administrators of wilderness in the Sierra Nevada on the question of how to enjoy wilderness without wearing it out, or, stated another way, how not to love it to death. It all could be summarized as the threat from the *inside*, a threat not to be minimized.

But the first conference had hardly got under way before people realized that the inside threat, important though it was, paled before the *outside* threat, the threat to exploit wilderness to extinction. The vanguard of wilderness preservers saw that it would do little good to argue about whether to bury litter in wilderness or to carry it out if, meanwhile, mop-up crews of exploiters were busy rolling up the boundaries of wilderness and getting rid of it.

It was noted that each exploitative group was fond of wilderness, and wanted only its own special kind of concession in it—just roads to take out the bug trees and improve the forest so that it would not be a biological desert, or to enable sportsmen to harvest the surplus game because it was a biological Eden, or to make it accessible to the lame and the halt, or to harvest the tree crop to avoid waste; just water development to maintain streamflow or improve forage for deer or to render it more accessible for outboard motors or to enhance the scenery; just a chance to try out man's new experiment, wildlands management. Each concession was admirable in itself. Each necessary in its place. But was wilderness the place? Or was wilderness something that needed guarding more than managing, careful respect for the forces that had built it and kept it, that were still building it and could still keep it, without benefit of man's technology? Was it possible that the chief managerial task in wilderness was to manage management lest wilderness, by definition, be managed to death?

There was growing conviction that wilderness could enhance the American standard of living—if the American standard of *having* did not extinguish wilderness first. It was postulated that if America were to ignore, for utilitarian purposes, that small part of its land area which is still wilderness, if America were to consider it there just to be enjoyed for what it is and not for what it could be remodeled into, then the nation would still survive handsomely—perhaps even more so. Just pretend it isn't there, the theory runs, and carry on business as usual *around* it; you won't regret it. There isn't too much heresy in the concept. Successful corporations call it a reserve. A successfully civilized nation ought to be able to set aside a reserve, not of money for a rainy day, but of wilderness for a rainy century—and enjoy it *as wilderness* until the rains come or even beyond that.

Early conferences cast about for some way to achieve this. Surely there must be a role for at least two branches of the government of a nation if something as irreplaceable as wilderness was at stake on the nation's land. The Executive Branch could designate and guard it, but the Legislative Branch should at least recognize it and grant wilderness an automatic stay of execution, whoever might wish to cancel it out. Out of all this the Wilderness Bill emerged. And out of the extended consideration the various versions of the bill received, the meaning of wilderness in the whole context of national resources became clearer. Perhaps what follows is a fair sketch of the relationship that has been seen to exist.

IT HAS BEEN THE CUSTOM to look at natural resources as of two kinds—renewable, such as foods and fibers; and nonrenewable, such as metals, minerals, and fossil fuels. It is now of major importance to look anew, to consider not how renewable a resource is, but whether we have prospects of finding a substitute for it.

This is so for two reasons:

1. Our rate of depletion of the "nonrenewables" is accelerating in spite of our knowledge of the following fact, succinctly put by Sir Charles Darwin: "During the whole of man's history there has been a great deal of mineral extracted from the earth, gold, copper, iron, coal, and so on. *More than half the grand total* of these metals and minerals has been taken out of the ground since 1920" (from the Rede Lecture, 1958, Cambridge).

2. Our renewables depend entirely upon the earth's thin skin of soil, and we are wasting these, at a rapidly increasing rate, through erosion by water and bulldozer; through burial, inundation and poisoning; and through eradication of species of unknown value to man's own future.

We know from the U.S. Geological Survey that the prospects are good of finding substitutes for the nonrenewables—through vastly improved technology in the processing of sea water and common rocks, aided by the almost unlimited store of energy from the atom and the sun that we are learning to control.

We have no assurance that we can find substitutes for the myriad, and for all we know, indispensable forms of life—in the soil, on the land, and in the air—upon which the entire chain of life depends.

Wilderness. The most important source of the vital organic forms constituting the chain of life is the gene bank that exists in wilderness, where the life force has gone on since the beginning uninterrupted by man and his technology. For this reason alone, it is important that the remnants of wilderness which we still have on our public lands be preserved by the best methods our form of government can find. The proposed National Wilderness Preservation System (now before the Congress) provides an excellent route to that goal, and especially dynamic leadership in the Congress and the Administration will be required during the next decade to really achieve the goal of wilderness preservation which the System would make possible. There will be important subsidiary benefits to recreation, to watershed protection, and to a continuation of the beauty of the native American scene.

A growing economy will have availed us nothing if it extinguishes our all-important wilderness. A gross misunderstanding of wilderness, in which it is evaluated according to the number of hikers who get into it, has been fostered for the past several years, to the great detriment of all the future. There must be no more needless, careless losses. There is no substitute for wilderness. What we now have is all that we shall ever have.

Other resource problems are of secondary importance, but still far more important than one would assume from a regular perusal of the nation's financial pages, or from most public speeches.

Forestry. The government badly needs a program that will bring to forestry a full realization that forests mean far more than timber and pulp. On many forests other uses should be given precedence, but rarely are. The overwhelming emphasis in the training of forest-land managers, and in the decisions they make, is on timber production. Reforestation, watershed protection, recreation, wildlife restoration, and wilderness preservation are suffering severely as a result.

Water. Reliance upon the reimbursable dollar as the primary criterion for water development can bring about bad projects and prevent good ones as long as there is no satisfactory means of assessing the perpetual dollar value of natural land and streams. The nation needs to proceed without delay to a classification of streams that will present to future generations a countryside with optimum water development and wild-stream preservation. Some of the streams should be primitive, some semi-primitive, some partly developed, and some fully developed. We have waited too long already to develop a national water plan based upon this simple and clearly necessary foundation. The interim delay in the effort to clean up open sewers cannot be continued.

Parks. Little time remains in which to rough out the undedicated areas having high scenic, wilderness, and wildlife values which should be added to the National Park System. The only error we can make now is to preserve too little. It has been much too long since a major scenic reservation was made in the United States proper, either by creation of new national parks by Congress or national monuments by proclamation. There has been too much "Let Roosevelt do it"—Teddy or Franklin. There is far too much parochialism evident now that the effort to round out the parks is getting belatedly into motion. Some 180 million acres were set aside as national forests in a bold, sweeping motion more than half a century ago. Within these areas are some of the finest potential parks, and a transfer of a small fraction of the national-forest total could greatly enrich the National Park System without appreciable impoverishment of our national forests—especially when the nation has some fifty million acres of forest land that was allowed to become impoverished and is critically in need of reforestation.

ROBERT RAUSCH

The Outlook for Conservation in Alaska

Robert Rausch received the degree of Doctor of Veterinary Medicine from Ohio State University, and his Ph.D. in parasitology from the University of Wisconsin. He has also studied at Michigan State University. He is now associated with the Arctic Health Research Center, United States Department of Health, Education and Welfare, and is chief of the Zoonotic Disease Section.

The destruction of irreplaceable Alaskan wilderness by special-interest groups is a fearsome possibility. Time remains for preservation of the astonishingly small amount of truly wild land remaining, but time passes rapidly. National Monuments are most vulnerable to exploitation, while their potential value as recreational areas is indicated by vastly increasing utilization of Mount McKinley National Park. Dr. Rausch proposes the establishment of state parks. He wisely adds that public education as to the value of conserving natural resources, while needed everywhere, would be especially appropriate now in Alaska. His paper provides a most informative survey of existing wilderness preserves and those currently proposed.

CONSERVATION in the broadest sense includes not only wise economic use of resources but also the perpetuation of natural areas with all their components, areas which may be utilized repeatedly by man and still left undepleted. The utilization of natural areas for scientific purposes is one of the most fruitful, as well as the least harmful, of the kinds of repeated use. In the past, Alaska has provided opportunities for basic research in many disciplines, largely because most of its area was in a primitive condition.

It is difficult to predict the effect of statehood on Alaskan resources, but it appears that it can do little more than accelerate the changes already in progress. Alaska is subject to the same pressures being felt in other parts of the world, not the least of which is a rapidly growing population. There is an ever-increasing demand for unrestricted development of the natural resources in order to promote further population growth and an industrial economy.

Although the development of Alaska is progressing at a comparatively slow rate, it is already evident that exploitation of some of the natural resources has been excessive and without much regard for the concept of sustained high yield.

One of the best examples of this is the seriously depleted salmon runs; another is the rapid disappearance, during the last decade, of undisturbed wilderness areas. I should like to review briefly some of the factors, such as fires, agriculture, development of mineral resources, and others which are bringing about these changes.

One of the most important causes for major vegetational alterations is fire, and to some extent it must be regarded as a natural phenomenon although in recent years many fires have been accidentally caused by man. The occurrence of fires and their ecological effects in Alaska have been reviewed by H. J. Lutz, in a publication of the U.S. Forest Service. Annual losses are very great; detailed statistics have been published by Lutz, and it suffices to say that the average area burned annually during a 15-year period beginning in 1940 was about one and a tenth million acres. Much damage can be expected in the future, since outbreaks are not often detected soon enough to permit rapid control.

Although there is great popular demand for settlement of new lands in Alaska, the agricultural potential appears to be much more restricted than was formerly believed. Hugh Johnson, agricultural economist with the U. S. Department of Agriculture, in a critical survey published in the 1958 *Yearbook of Agriculture*, states that a maximum of two to three million acres is physically suitable for cultivation, and as much as eight million additional acres could be used as pasture or rangeland. The maximum total area comprises about 17,200 square miles, or three per cent of the area of the State. In 1957, there were 20,000 acres of cropland in Alaska, while idle cropland and acres on which crops had failed made up an additional 2,000 acres.

With a sixty per cent increase since 1949, the present population of Alaska is about 211,000. According to the most conservative predictions made thus far, a population increase of about one hundred per cent is to be expected during the next decade. Irrespective of the validity of the estimate, most of the increase will undoubtedly be seen in the subarctic regions of southern and south-central Alaska, where conditions are most favorable for agricultural and industrial expansion.

New homesteads are continually being established, but relatively few have yet become productive. Johnson, in 1955, made an investigation of agricultural settlement on the Kenai Peninsula. Homesteading had been going on there for a period of forty years, but he found that fifty-nine per cent of all entered or patented land on the Peninsula was unoccupied and abandoned as of July, 1955. Another thirty-one per cent was used only as places of residence for persons not engaged in farming. Only one and three-tenths per cent of the occupied land was cropland, and nearly half of this had been cleared since 1950. Only fourteen per cent of all the income reported by homesteaders in 1955 came from the sales of farm products. In the Homer community alone, sixty per cent of all entries from 1915 to 1945 had been canceled, relinquished, or closed by decision. The situation is similar in the Tanana and Matanuska Valleys.

The high cost of clearing land, the long period of time before realization of any income, and insufficient demand for the most easily produced crops all contribute to the failure of homesteads. Few people today are willing to live as subsistence farmers, but it appears that little more can be expected during the first years of homesteading. In a paper presented at the Ninth Alaskan Science Conference, in 1958, Johnson pointed out that Alaska is not destined to be a major agricultural region, and that sufficient good land is either patented or available to meet the potential demand for farm products for years to come.

Fishing is still the most important industry in Alaska. The total value of fisheries products was about seventy-eight million dollars in 1954, and seventy million in 1955. Efforts are being made toward broader utilization of the fisheries' resources, and the outlook is generally good. Crabs, shrimps and other groups are all increasing in importance.

There has been a constant decline in the numbers of salmon, and the future of the salmon fishery depends upon successful rehabilitation of this resource. The highly efficient salmon traps have finally been abolished, according to the latest available information; this action ostensibly has great conservation value, but this probably won't be the case in practice, for the present attitude is to substitute other methods for the traps so that the total take, unless somehow regulated, will be about the same. There is much popular resistance in Alaska to the establishment of control measures designed to restore the salmon in order to ensure a sustained high yield. This is perhaps understandable, since in some areas the economic losses would be nearly disastrous, at least temporarily. Just before I left, the word came that the Bristol Bay area has just been closed to commercial fishing, but it is not at all certain that will not be changed.

Lately, there has been less tendency to blame predators for the results of overfishing, although I think it is still the practice to try to control seals in southeast Alaska by means of dynamite, and it has been learned that many "Alaskan" salmon are being taken by Japanese fishermen on the high seas. Few people but the biologists seem willing to admit that there are at present too many fishermen and too few fish.

Alaska's potential for hydroelectric power is considerable, and it is generally believed that industry would be attracted if cheap power were available. However, the resultant dams for hydroelectric purposes would also destroy some valuable salmon runs. As an example of this conflict of values, a dam at Wood Canyon, on the Copper River, would produce more than a million kilowatts. At the same time, the Copper River is one of the important salmon streams. During the 10-year period from 1940 to 1949, the annual value of the salmon pack from the combined Copper River and Bering River drainages averaged more than one and a third million dollars. Elsewhere, such as in the Kenai Lake area, a series of small dams is now being built. Each of these causes a negligible loss, but the total attrition of all these dams to the fish resources is quite important. However, each dam has been justified by the evaluation of its separate effect, which produces an erroneous concept of the effects of all, and this in the end will be the significant factor.

Construction of hydroelectric facilities in Alaska in the near future seems unlikely. The Harvey Aluminum Company, which had been granted a permit to investigate the power potential of the Copper River, has relinquished all claims. Considerable publicity has been given the possibility of establishing a hydroelectric development at Rampart, on the Yukon River, but positive action seems far in the future. Since other sources of power may be practicable within a few years, it is hoped that hydroelectric projects in Alaska will not be necessary. Large quantities of coal are now available locally but are not being used to any great extent.

Lumbering has already superseded mining as the second most important resource industry, although operations have been reduced by adverse market conditions. The utilization of forest resources is limited mainly to the coastal regions of southern and southeastern Alaska, where the Forest Service has awarded contracts for pulp and plywood operation. Only a small portion of the allotted timber is being used at the present time. When the resources of southeastern Alaska have been fully committed, it is possible that the forests of interior Alaska may be drawn upon as a source of pulp. At the present time, several small sawmills in the interior are producing lumber for local consumption, but large-scale operations are not expected in the foreseeable future.

With the exception of oil explorations, mining activity is decreasing, mainly because of unfavorable markets. Some of the larger oil companies have been investing heavily in exploration and prospecting programs in several areas. The greatest activity has taken place on the Kenai Peninsula, where three wells have been completed and two are in progress. One of these wells produced a maximum of 800 barrels per day. After having drilled a well 14,000 feet deep at a cost of about $500 per foot, one of the companies has discontinued operations on the upper Alaskan Peninsula. So far, oil operations do not seem to conflict seriously with conservation interests; the companies have been cooperative and have impounded any oil that might contaminate streams or lakes.

In January, Senator Bartlett introduced a bill providing for the abolishment of Naval Petroleum Reserve No. 4 (which lies across the Arctic Slope in northern Alaska) and granting jurisdiction over the area to the Secretary of the Interior, with the plan that resources here could be privately developed. The bill was referred to the Committee on Armed Services. In this case, opening this reserve could lead to serious damage to an important natural area.

Defense activities have been one of the most important factors responsible for changes in many areas that formerly were relatively undisturbed. The construction of the Distant Early Warning system along the Arctic Coast has left no distance greater than 50 miles without some type of installation. Sites for other purposes have been established throughout the State, usually in hitherto remote and practically undisturbed areas. These activities have led also to the building of numerous landing fields which allow access to the surrounding country.

As the population of Alaska has increased, the demands for outdoor recreation have increased correspondingly. Many people who emigrate to Alaska are motivated in part by an interest in hunting and fishing; others develop these interests in the absence of opportunities for recreation of other types. A high proportion of military personnel participate in outdoor activities.

As a result of the population growth, areas readily accessible by roads from the major population centers are becoming inadequate both in quantity and quality to meet the demands for outdoor recreation. On the Kenai Peninsula, for example, lakes and streams once noted for excellent fishing have been overfished, with the result that there is much competition for space in the best remaining areas. Lakes that were seldom visited five years ago are now surrounded by cabins and their surfaces swarm with motorboats. During the big-game season, areas such as the Matanuska Valley and the country along the Denali Highway are so crowded as to make hunting unpleasant as well as somewhat unsafe.

The popular demand for better recreational opportunities has been one of the main causes for greatly increased use of small airplanes. There are at the present time about 1400 privately owned airplanes in Alaska, and as of December 31, 1957, there were 2,417 active pilots. As of April 1, 1958, there were 161 public airports. It is estimated that ten per cent of all float-equipped planes registered in the United States are based at Lake Hood, just outside Anchorage. Many of the small airplanes operate commercially to transport hunters and fishermen to otherwise inaccessible areas. Such services were formerly provided mainly by a few professional guides with long experience and good reputation, but others are participating more and more in these activities. Many of the latter operate only during the big-game season, when the demand for such transportation is greatest.

The small airplane is probably the greatest single factor contributing to the changes taking place in the Alaskan wilderness. No area containing a lake or gravel bar large enough to permit a landing is overlooked, and no region is too distant. Some more hardy individuals even hike in to regions where game is abundant in order to clear a place large enough to permit the landing of a small plane. The increased use of small airplanes has led to an active competition among the guides and certainly has greatly intensified the hunting pressure on those species of animals least able to withstand it.

Roads are still few in Alaska, but the Seward, Taylor, and Denali Highways have, within the last years, opened great areas of previously uninterrupted wilderness. Among projects for the future, roads from Anchorage to McGrath and from Fairbanks to Nome have been given priority. It is generally true that people do not walk far from the highways, even during the hunting seasons. However, various kinds of tracked vehicles from roadside headquarters are being used with increasing frequency to travel overland for hunting purposes.

Wilderness values in Alaska are being impaired in other ways, often quite unnecessarily. Anyone familiar with the wet tundra knows that the passing of a single vehicle during the warmer months makes a scar that remains for years. Great areas along the Arctic Coast have unfortunately been defaced in this manner.

A few of the Federal agencies make it a practice to discard empty steel drums and other indestructible debris along transport routes in the Arctic. In fact, much of the Arctic Slope in the Naval Petroleum Reserve is well on its way to becoming a gigantic dump.

Since 1949, I have spent much time in the central part of the Brooks Range, and have often camped with the Eskimos along the shores of a lake situated in a broad valley. In the spring of 1956, I was much disturbed to find that the most interesting area had been used as a gasoline dump by one of the Federal agencies concerned with topographic surveys. Large numbers of gasoline drums had been dropped from a cargo plane for use by ground personnel, and of course the drums were left when the work was completed. Here was a situation where a few irresponsible white men had done more in a day to disfigure the wilderness than the Eskimos had been able to do in many generations.

It is indeed well that we have some special reservations, though all too few, where regulations ensure the preservation of the country and the wildlife in a natural state. I should like to review briefly the status of some of these areas, which fall into three categories—National Parks and Monuments, National Wildlife Refuges, and National Forests, the latter two being multiple-use areas of great importance to a variety of interests.

NATIONAL PARKS AND MONUMENTS

Three areas under the control of the National Park Service have great value as wilderness areas and are becoming increasingly important for recreation.

Mount McKinley National Park (area: 3,030 square miles). Situated in the Alaska Range, this Park has spectacular mountains and glaciers and is the only area of interior wilderness that has been set aside for preservation. It is the only easily accessible place in Alaska where tourists can expect to see most of the species of large animals at close range.

Previously accessible by rail or plane only, the completion of the Denali Highway in the fall of 1957 made it possible to drive to the Park. In 1956, the Park was visited by about 6,000 people. In 1957, when the road was first opened, there were about 11,000. There were 26,000 people in 1958, and ever increasing crowds can be expected in the future.

Katmai National Monument (area: 4,214 square miles). Established to preserve the area affected by the volcanic eruption of 1912, it contains spectacular wilderness and abundant wildlife.

In a release last February to the Associated Press, Senator Bartlett advocated a reduction in the size of Katmai National Monument. He considers the area to be excessively large and wants to eliminate land which he defines as "not up to Monument standards." Senator Bartlett's view was strongly supported in an editorial in Alaska's largest newspaper, the *Anchorage Times*, which pointed out that the region was inaccessible and rarely visited by Alaskans.

There is no evidence that the Monument contains valuable minerals, and certainly this land is not needed for homesteading or other agricultural pursuits.

Glacier Bay National Monument (area: 3,554 square miles). This is a region of spectacular mountains and glaciers, with abundant wildlife. The Monument preserves an area of coastal forest in all stages of post-glacial development. Although not now accessible by highway, it can easily be reached by boat or plane from cities in southeastern Alaska.

NATIONAL WILDLIFE REFUGES

There are fifteen National Wildlife Refuges in Alaska at the present time. Largest is the *Aleutian Islands Refuge* (area: 4,250 square miles). Established in 1913 to protect sea otters and other wildlife, the Refuge includes all of the Aleutian Islands except Umnak, Unalaska, Akun, Akutan, and Tigalda. Of the islands in the Refuge, Atka has Aleut villages; an active airfield is found on Shemya; Adak has a large naval base. Several of the islands have deserted military installations that are rapidly deteriorating at the present time.

Unimak, the largest island and first at the end of the Peninsula, has a continental-type fauna. During the time fur farming was widely practiced, arctic foxes were introduced on several of the islands, and they still remain in most cases. Rats also have been introduced, and they have become feral. Ten caribou were placed on Adak Island in 1958, so there would be hunting for the benefit of Navy personnel. The executive order by which the Refuge was established provides for military use of the islands whenever considered necessary.

A proposal to withdraw all tidelands and adjoining areas of water extending three miles beyond low tide line in the Aleutian Islands Refuge, to permit more effective management of sea otter, was published in the *Federal Register* of October 23, 1958. However, Senator Bartlett considers the tidelands to be state property and has urged that this order be withdrawn.

Bering Sea Refuge consists of Hall and St. Matthew islands and Pinnacle Rock, with a total area of 64 square miles. This Refuge was created in 1909 for the protection of sea birds. These are mountainous islands with a maritime climate and arctic-type flora. Two species of indigenous land mammals are present.

Reindeer were introduced in 1942 for the use of military personnel stationed on St. Matthew during the war. I think twenty-four animals were originally introduced, and in 1954 I estimated the population to be 600; a census made in 1957 by Fish and Wildlife Service personnel disclosed about 1200 animals. The rapid increase of these reindeer will have serious effects on the vegetation, but they are being left so that observations may be continued. I am strongly in favor of removing the reindeer. These islands are very rarely visited and will retain their original character unless the reindeer cause irreparable damage to the vegetation.

Kodiak Island Refuge, with an area of 3,046 square miles, was established in 1941 for the protection of brown bear. The entire population of a unique form of brown bear is restricted to Kodiak Island and the neighboring islands of Afognak and Shuyak which lie to the north. The Refuge is important to migratory waterfowl. Sitka black-tailed deer are abundant, mountain goats have recently been introduced along with several species of smaller mammals, and there is some evidence now that the elk introduced on Afognak Island are crossing over to Kodiak.

A few small installations connected with fisheries research operate within the Refuge, and some of the guides maintain hunting cabins, but these detract little from the wilderness value of the Refuge. Recent boundary changes placed a mile-wide strip around the Refuge under control of the Fish and Wildlife Service, thus forestalling inappropriate use by private interests.

Much of the land outside the Refuge is occupied by cattle ranchers, who lease public land for a negligible fee. This industry is handicapped by inadequate winter range and by lack of a market for the unfinished beef produced. It is quite evident, from a purely monetary standpoint, that Kodiak Island can best produce bears.

Pribilof Islands Refuge, consisting of 78 square miles, was established in 1910 for the protection of the breeding grounds and management of fur seals. The two main islands, St. Paul and St. George, comprise the breeding grounds of a fur seal herd numbering about one and one-half million animals. There are also great colonies of sea birds, and about three species of smaller mammals, as well as colonies of Steller's sea lion.

The Refuge is managed by the Bureau of Commercial Fisheries and no change in its status is anticipated.

Nunivak Island Refuge contains 1,733 square miles that were set aside in 1929 for the protection of muskoxen.

The mountainous island now supports a herd of about 140 muskoxen, which are the descendants of 34 animals introduced from Greenland in 1930. Also present is a large herd of reindeer now being managed by the Federal Government and probably soon to be placed under the control of the Eskimos, of whom there are about 300 inhabiting the island. Serious damage to the range resulted earlier from the numbers of reindeer which were at one time excessive. Waterfowl and large colonies of cliff-nesting sea birds are numerous.

Bogoslof Island Refuge, six-tenths of a square mile, was established in 1909 and is one of the few places where Steller's sea lion is protected. Sea birds are numerous here.

Simeonof Island Refuge of 16 square miles, an island in the Shumagin Group, was set aside in 1958 to protect sea otter which are beginning to be numerous in this area. The island itself will be leased for grazing.

Kenai Moose Range consists of 2,894 square miles established in 1941. The range includes one of the most intensively used recreation areas in Alaska, since it is easily reached by highway from Anchorage. The northern half of the refuge, comprising about 1790 square miles, has been opened for oil exploration. Three wells have been drilled and two are in progress. An effort is being made to consolidate the installations so as to retain the undisturbed areas in as large tracts as possible. The personnel of the oil companies have shown a cooperative attitude and have expressed the intention of interfering as little as possible with the wildlife resources.

The major nesting grounds of the trumpeter swan in Alaska are included within the area open to exploration. Fish and Wildlife personnel observed about twenty nests in 1958 and found no evidence that any had been disturbed by activities connected with the oil development.

Since the spruce forest is the climax vegetation here, management of the refuge for moose productivity requires the development of winter range. It is planned to restrict habitat modification to areas already disturbed by the explorations for oil or by roads, or to areas of maximum public use. In 1947, a fire burned about 290,000 acres of the Refuge, and the following replacement of spruce by willow, aspen, and birch greatly improved the habitat for moose.

The southern half of the range, about 1100 square miles, will be maintained as a natural area. This includes the upper moose range, the sheep range, and is an area of spectacular mountain scenery.

Besides the Wildlife Refuges I have mentioned, several small reserves have been established to protect sea birds or waterfowl. These are Chamisso Island, Forrester Island, Hazen Bay, Hazy Islands, St. Lazaria Island, Semidi and Tuxedni Islands. All of these are quite remote and rarely visited.

NATIONAL FORESTS

There are two National Forests in Alaska; *Chugach National Forest* has an area of 7,502 square miles and includes Afognak and Shuyak Islands which lie north of Kodiak, the eastern portion of the Kenai Peninsula, and also the Prince William Sound region with all of the islands of the Prince William Sound Archipelago.

The portion of the Forest on the Kenai Peninsula is traversed by the Seward Highway and the upper Sterling Highway; it is near the major population center of Anchorage and consequently is an important recreation area. The proposed Copper River Highway will pass through the National Forest to Cordova which is a small town on Prince William Sound.

Tongass National Forest has an area of 25,072 square miles and includes most of the mainland of southeastern Alaska as well as the islands of the

Alexander Archipelago. Several towns lie within the forest, including some large Indian villages.

PROPOSED REFUGES

In addition to the aforementioned reservations, the Department of the Interior has proposed the creation of three new wildlife refuges.

The ***Kuskokwim Refuge*** would contain 2,924 square miles of wet tundra which has great importance as a breeding ground for waterfowl. No management is proposed here, and no detrimental use of the area is foreseen. This region is uninhabited, although some hunting and trapping are done here by the Eskimos. The establishment of this refuge has received considerable opposition and almost no public support.

The ***Izembec Refuge,*** also for waterfowl, would contain 680 square miles. A small military reservation is in the area and it is bordered on the south by an active airfield. No physical development of the area is planned.

The proposed *Arctic Wildlife Range,* with an area of 10,000 square miles, would encompass portions of the Arctic Coastal Plain and the highest peaks of the Brooks Range, a region of rugged mountains, lakes, and tundra, and would extend into the boreal forest zone of the south slope of the Range. Here, in the Romanzov Mountains, on Mounts Chamberlin and Michelson, are found the only glaciers in northern Alaska. The fauna of the area is remarkably abundant, and the species of arctic plants are well represented.

The reestablishment of the muskox, which has been extinct as an indigenous mammal in Alaska for more than 70 years, is planned. To quote Ross L. Leffler, Assistant Secretary of the Department of the Interior, "The Arctic Wildlife Range should be administered for the protection of wildlife and wilderness recreation values, and scientific studies in designated research areas would be encouraged to promote the maintenance of undisturbed ecological and wilderness conditions." Hunting and trapping would not be restricted in this area, nor would there be any restriction of mineral exploration, development, or removal. Any such developments would have to be limited to the areas of proven mineral claims, and this of course precludes many objections that would otherwise arise.

I should like to emphasize that the United States does not have a single arctic area set aside for preservation. The future scientific and cultural value of such an area is self-evident, and it would be an incalculable loss if establishment of this reservation is prevented by relatively few people concerned with the possibility of immediate economic gain. However, the Alaskan State Legislature on March 14 passed a resolution against the establishment of the Arctic Wildlife Range. With the exception of the Tanana Valley Sportsmen's Association, which expressed support for the Range, little public support has been manifested, but many individuals who have expressed no opinion publicly also favor its creation.

The three proposed refuges would add a total of 13,725 square miles to the established reservations. Many of these reservations have already provided opportunities for important basic and applied research in biology and other fields. Such areas will have much greater importance when few suitable unprotected regions remain.

I should like to mention briefly the status of certain species of wildlife in Alaska, based largely upon information from personnel of the Fish and Wildlife Service.

The last four winters have been remarkably mild, with the result that there has been good survival of moose and caribou. The caribou herd in the Nelchina area, about 200 miles northeast of Anchorage, numbers at least 45,000 animals. Since the annual kill never exceeds 4000 animals, the size of the herd is rapidly increasing. As pointed out by Leopold and Darling in 1953, there is a continuing danger that the winter range will be depleted. The herd is already moving much farther to the west during the winter months, and many animals are now found well into the Talkeetna Mountains which lie northeast of Anchorage. The possibility exists that a large portion of the herd may move into the Mount McKinley area and for all practical purposes become unavailable to hunters. The numbers of the Steese Highway herd in eastern Alaska have decreased because many animals have remained in northern Canada. The herds on the Arctic Slope are increasing and gradually invading regions from which they have been absent in recent years.

Moose are quite abundant south of the Alaska Range, where both reproduction rate and survival rate have been high. Moose appear to be extending their range in all directions—for the first time last spring several were killed even in the vicinity of Point Barrow which is certainly far from their usual habitat. In most cases, wandering animals are killed before a population can be established in new areas.

Elk on Afognak Island have increased from only 8 in 1929 (when they were introduced) to a herd of 800 animals; 111 were killed in 1958 by a total of 345 hunters.

Sitka deer, goats, and sheep seem generally to be maintaining their numbers. The Sitka deer are becoming abundant in some areas, such as on Kodiak Island.

There has been some indication that brown bears have decreased on the upper Alaska Peninsula during the last two to three years. The population compares favorably, however, with that of the brown bears on Kodiak Island, as shown by observations in 1958 on sex and age composition. The illegal killing of bears, especially by fishermen, is a serious problem, since this is done commonly wherever bears are vulnerable. Most of the cattlemen on Kodiak attempt to kill every bear they see, without determining whether or not the animals are cattle killers.

Hunting of brown bears by airplane in early spring is now largely prevented by slight adjustments in the time of the open season. Some changes in open season are also contemplated on Kodiak Island in order to reduce the kill of female bears.

Despite the bounty on wolverines, there has been apparently no significant decrease in their numbers. Some remedial legislation is needed to stop the killing of these animals from planes.

Wolves are intensively hunted by means of airplanes. The Nelchina area has finally been closed to wolf killing, and personnel of the Predator Control Division of the Fish and Wildlife Service have been investigating the movements and other habits of the single pack still present. This pack included ten animals until the recent kill of three near the boundary of the closed area. It is now proposed to enlarge the refuge, so as to afford the remaining animals more adequate protection. I believe that approximately 200 wolves were killed in this area over the preceding years.

Predator control is being continued, though on a somewhat reduced scale. Nothing is being done on the Arctic Slope, but this advantage is offset by the amount of bounty hunting by private individuals using small planes. Small planes from as far away as Anchorage engage in hunting wolves in the Arctic, and many animals are killed annually in this way.

The almost complete lack of information on the bionomics of polar bears makes any statement as to their status purely speculative. It has never been established whether the same individual animals are hunted throughout the circumpolar regions whenever they approach inhabited lands. The take of polar bears in Alaska has increased annually during the last few years. Almost all hunting is accomplished by the use of planes; some based in Arctic Coast villages and others from as far away as Anchorage work out of villages such as Nome, Kotzebue, and Point Hope. Since the hunts take place over international waters, sometimes as far as 200 miles from land, regulations are very difficult to establish and enforce.

Walrus probably need additional protection. The annual kill appears to be excessively large, and hunting techniques and utilization are grossly inefficient. Better control over the hunting activities of the Eskimos would be desirable. Sport hunting of walrus has been permitted during the last year or two, but the kill is much too small to have any significance. The Department of the Interior has planned to investigate the possibilities of an international agreement which might lead to better management of both polar bears and walrus.

During the last few years, the U.S. Fish and Wildlife Service and the Territorial Department of Fish and Game have had joint responsibility for the wildlife resources, although the Territorial organization had little authority. This arrangement led to some unusual situations; as an example, the wolverine is a fur-bearing animal according to Federal law, but a bounty was placed on wolverines by the Territory. Consequently, killing a wolverine out of season for the bounty was a punishable offense, whereas a bounty was paid when the animals were legally taken as fur animals during the open season.

The State will probably gain control over wildlife resources in about January, 1960, but before this is realized, it must be demonstrated to the satisfaction of the Secretary of the Interior that adequate provision has been made for the administration, management, and conservation of these resources in the broad national interest. This wise requirement should do much to ensure a carefully prepared program.

The bill which would create the Alaska Department of Fish and Game apparently is now awaiting the acting governor's signature, and I have not read the final version. However, it was based upon a model bill drawn up by the International Association of Game, Fish, and Conservation Commissioners, with certain changes adapting it to Alaskan conditions. In the latest form of the bill, the proposal for a Fish and Game Commission has apparently been deleted.

Although the administrative organization is somewhat indefinite, the new department is expected to have five divisions which will be concerned with game, sport fish, commercial fish, biological research, and enforcement. The State will be divided into at least three major management areas.

During the last year, the Territorial organization has attempted to recruit well-trained men, all of whom will continue on in the State's Department. A small number of experienced biologists will transfer from the Fish and Wildlife Service; most of these had been supported by Pitman-Robertson funds in the past. The Game Division plans to hire twenty biologists during the first year and expects to have a staff of forty biologists within three years.

On July 1, the Alaska Department of Fish and Game will become eligible for Federal matching funds under the provisions for Federal Aid. A maximum of about $850,000 will be available for game, and about $250,000 for sport fish; but since it is improbable that Alaska can match all of the Federal Aid money available, the Game Division expects a maximum of about $400,000 during the first year. A bill also has been introduced to provide licensing of hunting and fishing, with a suggested schedule of fees and the revenue anticipated, which is expected to amount to about $569,000, or about sixty-five per cent more than license collections in the fiscal year 1958. The expected revenue will probably be retained within the Department of Fish and Game.

The Division of Biological Research will be concerned mainly with basic investigations and consequently will not be eligible for Federal Aid money. It will be supported initially by appropriations, but I shall not attempt to predict how adequate such funds might be. Predator control will fall into this Division, as now planned. The Department does not expect to support a general predator control program but intends to initiate some investigations of predator-prey relationships. The State organization also will specify when, where, and how the Fish and Wildlife Service predator-control personnel will operate.

A very tight budget may assist toward eventual elimination of the outmoded bounty system. Just recently, the Legislature appropriated $107,500 of a proposed $143,000 to bring unpaid bounty claims up to date. It should not be too difficult for a good many people to realize that such funds could be much more effectively utilized.

It appears that the Enforcement Division will suffer from inadequate funds, and this may be one of the major weaknesses of the new organization. Much will also depend upon whether important positions are filled on the basis of qualifications or by political expediency.

The outlook for the establishment of state parks appears promising. The Bureau of Land Management has received $100,000 annually for the creation and maintenance of roadside campgrounds, and this money now will go to the state. About fifty exist and forty-two more are proposed. Three 5000-acre tracts have recently been set aside for state parks; these include part of the Lake George area, with the right-of-way from the Glenn Highway, an area along Eagle River near Anchorage, and the Worthington Glacier area on the Richardson Highway near Valdez. The State has the authority, over a twenty-five-year period, to select about 103 million acres from the public domain. Some of this land probably will be used for the establishment of recreational facilities. In addition, two special grants of 400,000 acres each, one of which involves National Forest land, have been made to the State for the purpose of community enlargement.

In the report of the National Resources Committee for December, 1937, Robert Marshall made the following statement: "Alaska is unique among all recreational areas belonging to the United States because Alaska is yet largely a wilderness. In the name of a balanced use of American resources, let's keep Alaska largely a wilderness!" Yet twenty years later very little of Alaska is a wilderness in the true sense of the word, and very few inviolable reservations have been established.

As a comparison, I should like to point out that the State of California, with an area of 158,693 square miles, has 37,771 square miles of reservations if one includes only National Parks and Monuments, National Forests, and State Parks. These reservations make up twenty-three and eight-tenths per cent of the area of the State. Alaska is three and six-tenths times as large as California, but has only one and four-tenths as much area set aside at the present time. Moreover, Alaska has a population of only 211,000 as compared with about 13,000,000 in California.

Fortunately for California, some of its earlier citizens had the foresight to set aside the natural areas which today are so highly valued. Many Alaskans feel that we should wait until the need is more evident before additional wilderness is preserved, not realizing that when everyone is convinced that such action is necessary, the opportunity will have been lost.

Unfortunately, many Alaskans are not well enough acquainted with the natural features of the State to realize how rapidly changes are taking place. Few people have the opportunity to travel in the remote regions and also many are not able to distinguish between seriously disturbed and natural wilderness, as long as all is green. That it is sometimes difficult to secure adequate popular support for proposed withdrawals of lands for conservation purposes is therefore not remarkable, particularly when one considers the adverse publicity such proposals so often receive in the Alaskan press. In view of this, it is encouraging that the proposed Arctic Wildlife Range, for example, has received the public support that it has in Alaska. Much of the credit for this goes to Olaus Murie and others who have been able to define the values involved in a strikingly understandable way. Nature conservation has enjoyed few advocates in Alaska, as compared with the many spokesmen for those who anticipate monetary gain through exploitation of natural resources. Since monetary values are so often the basis for action, let us hope that there will be an increasing awareness that the future economy of the State will benefit greatly from the tourists and others who are attracted by the recreational opportunities Alaska affords.

Alaska is now in a critical stage of its economic development. The desire and need for expansion in all phases of its economy conflict strongly with the aesthetic and scientific values to be gained by the provident institution of wilderness reserves inviolate to exploitation by the contemporary few, and which will retain their values unchanged for the enlightenment and enjoyment of ensuing generations. In conclusion I should like to emphasize a few points which seem particularly to require attention of conservationists:

1. Additional support is needed for the Arctic Wildlife Range and the Kuskokwim and Izembec Refuges.

2. It will be necessary to guard against possible demands of special interest groups who may desire access to certain reservations to the detriment of the national interest. The National Monuments are most vulnerable. It would be highly desirable to make National Parks of both Katmai and Glacier Bay National Monuments. The potential value of these Monuments as recreation areas can be visualized when one considers the increasing utilization of Mount McKinley National Park. Only 6000 people visited the Park in 1956; 10.600 in 1957; 25,900 in 1958. More are expected yearly.

3. The establishment by the new State of state parks.

4. Legislation must be encouraged to protect such species as polar bear, walrus, wolves, and others, which may not be able to withstand the effects of increased hunting or destruction of habitat.

5. Education in our public schools as to the values of conservation of natural resources is needed everywhere, but it would be especially helpful and appropriate now in Alaska, where the incompatibilities of development and conservation have been greatly emphasized.

Time still remains for the preservation of a few small fragments of primitive Alaska, but it is rapidly running out. If we do not persist more diligently in our efforts, assets of inestimable value will be irrevocably lost.

DISCUSSION

RICHARD M. LEONARD, *Discussion Leader*

LEONARD: There is one paradox that has always struck me as applicable to Alaska. We have lost part of our civilization in Greece, in Persia, in Spain, in India, and so often the people have thought it was God's handiwork, or the devil's, or somebody's other than their own. It occurred over a long enough period of time so that they blamed other causes. Paradoxically, in America we have destroyed our resources so rapidly that we have been able to see that it is our own causes; cause and effect are close enough to be able to discern. Now in Alaska, as Dr. Rausch has pointed out, you can see that process accelerated again. The problem we have before us is how to temper that and how to apply the lessons we have learned in the rest of the United States—and in the Near East, in Spain, in Egypt, in India, and elsewhere—to the relatively new country of Alaska.

ROSCOE POLAND (San Diego): Perhaps I have misunderstood, but did you say that in order to protect the salmon in some localities they resorted to dynamiting seals?

DR. RAUSCH: That is right. In southeastern Alaska, where the channels are suited to that type of operation, it has been the practice to use dynamite in the deeper water when seals are passing through. In that way large numbers are killed.

POLAND: Who does this?

RAUSCH: I believe the former Territorial authorities were doing that. Whether the State personnel will continue I do not know.

LEONARD: Do you have information, or does anyone from the Bureau of Land Management know exactly what is the present status of the Arctic Wildlife Range? You mentioned that it needs support, and I recognize that. What legal steps are still to be taken to make it a more permanent actuality?

RAUSCH: I have not heard the latest information about that.

LEONARD: Is there anyone from the Bureau of Land Management here who could give us information on that?

HOWARD ZAHNISER (Executive Secretary of the Wilderness Society, Washington, D. C.): Legislation is being prepared for introduction in Congress to give Congressional sanction to the establishment of the area. That has been expected for some time, but has not been introduced. In the meantime, there is a prevailing uncertainty. With regard to it, the best course would be recommendations to the Secretary of the Interior or to the House of Representatives or Senators.

LEONARD: I have always thought it was wise to support the Secretary with legislation, but it has always been my impression that the Secretary has not yet made the full legal proclamations that are available to him under law. Is that correct?

ZAHNISER: That is true.

LEONARD: The Secretary still needs urging on the part of conservationists to firm this up.

ZAHNISER: At the time of the first announcement of the Arctic Wildlife Range, assurance was given by the Department of the Interior that if legislation were not obtained, the Secretary would take those final steps. But for various reasons, legislation was not even introduced until the Eighty-fifth Congress, and then it was expected to be introduced in the Eighty-sixth but hasn't as yet been received there. That is about as much as I think it is discreet to say here—to convey the impression that the Secretary might be urged to lend his support to obtain legislation or take other action, and that representatives in the Senate and the House, both of whom we have touched, should be informed about the importance of it. I had not heard until this very excellent paper about the action of the Legislature in Alaska. The almost inevitable tendency of that would be to add to the difficulties in obtaining legislation in Congress, now that the Senate has on the Committee that would handle the matter representation from Alaska with that kind of background.

LEONARD: We are fortunate that we have in the Alaskan Legislature at least one conservationist, Grant Pearson, the former Superintendent of Mount McKinley National Park for approximately ten years. Grant is vigorously working for conservation, but that is only one voice out of a great many. In a new area like that they do need a lot of support, and fortunately we had a meeting of a small group of young folks from Alaska who want to form an Alaska conservation organization. They recognize as we do the need for having these views brought out to the Legislature by Alaskans, because for foreigners from California, Washington, or anywhere else to try to tell Alaskans how to manage their natural resource affairs would probably be not very tasteful. So if any of you who have friends in Alaska can help towards formation of such an organization it would be helpful.

ZAHNISER: I might add a reminder that the importance of the legislation, as the Secretary and others have seen it, is in this fact: at present, our Secretary could withdraw the area as far as the minerals are concerned. He could prohibit them or he could continue them, but he could not continue them in a modified way, subject to regulations. The Congress would have the authority to provide the kind of limited program they have in mind, so that if the Secretary depended on himself he could only prohibit, and that seems to be an impolitic thing to do.

OLAUS MURIE: I might say that when we were up there to look over that area, we met with many people throughout Alaska. As Dr. Rausch said, the Tanana Valley Sportsmen's Association was one hundred per cent with us and also two of the gun clubs near Fairbanks were with us. I always feel that we have to call on the women to help us out, and they really did this time.

I want to say too that as far as that Arctic Wildlife Range is concerned, certain Canadian officials are now very much interested to see what we are going to do on our side, and they have in mind making a similar area on the Canadian side. This Arctic Wildlife Range goes right up to the Canadian boundary, and there is a wonderful caribou migration through there. This area, big as it is, does not contain that herd; it comes from the west and crosses this area and goes into Canada, or part of it at least, for the winter. And so the Canadians are thinking of setting up a similar area on their side of the boundary, and I hope that we have the wisdom as a people to set this area aside and show the other nation that we mean business. We will then encourage them to do likewise. They are waiting now to see what we will do on our side, and so many nations around the world are in the same fix as we are. Some of the conservationists throughout the world are trying to set these areas aside, and no matter where it happens, whether it is in Turkey, Scandinavia, New Zealand, or Alaska, it all helps the general program if anyone makes a move in the right direction and encourages someone else to do likewise. That is the case with the Arctic Wildlife Range.

LEONARD: The Quetico-Superior area back in Minnesota and Ontario is an excellent example of the cooperation between Canada and the United States that Olaus was speaking about. There again the Canadian Government has set aside nearly four million acres of roadless area to be dedicated to wilderness values along with the almost equally large area in the Superior National Forest through the roadless area set up by the United States Forest Service on the American side.

PAUL ZINKE (School of Forestry, University of California): I would like to ask Dr. Rausch if in this regard there is any plan to increase the National Forest area in the interior of Alaska, particularly in the Tanana River forests, and possibly to take advantage of the National Forest Wilderness System.

RAUSCH: Just before I came down, I talked to some of the National Forest personnel in Anchorage, and they did not indicate that there would be any increase at all, but they did assume that they would lose little if any of the areas they now hold.

WILLIAM YEOMANS (California Public Outdoor Recreation Plan Committee): This matter of preserving inland lakes from air travel confuses me, as I understand the Quetico-Superior area is now protected by an air barrier. Yet in Alaska, and I have been there a few months myself, this is the only means of reaching these lakes. I would like to know how Dr. Rausch feels there can be a resolution of this conflict, since this is the means of accessibility and yet it can destroy the very quality which you seek to preserve.

Rausch: I think there is probably no very satisfactory solution to that. As you say, it is the only way people can travel in the more remote areas, and perhaps it could only be regulated in areas that are completely closed. Of course there would be a great deal of objection if there were any attempt to do that.

Pauline Dyer: I would like to ask Dr. Rausch if he is acquainted with the present status of the proposed Tracy Arm-Ford's Terror Wilderness Area in the Tongass National Forest. I understand there were hearings two years ago. Do you know where that is and if the Forest Service has any plans for creating wilderness areas on the lands within their jurisdiction?

Rausch: I know where the area is, but according to the latest information I have, there is no particular plan to set aside any of the area there.

Starker Leopold: I want to ask Dr. Rausch about the status of range studies in central and northern Alaska, range studies that is for caribou and reindeer. At the time that Dr. Darling and I were up there eight years ago, it seemed to me that there was a desperate need for understanding the range requirements of these two animals and for comparing the ranges which appeared to us to be over-exploited by the domestic reindeer, with the wilderness ranges which were lightly grazed by the caribou. How far have those range studies progressed?

Rausch: The Fish and Wildlife Service personnel with Dr. Herbert Hansen carried on some rather extensive studies in the Nelchina area; I believe it was the summer before last. But I think that will not be continued, because the Fish and Wildlife Service personnel will no longer have Pitman-Robertson funds available for this work after July 1, 1959. The results of that work I do not think have been published.

Charlotte Mauk (Director, Sierra Club): Ansel Adams, in discussing such conferences as this said: "Yes, they are very fine, but you are just talking to yourselves. What are you going to do about telling other people?" And that has been troubling me for a good many years. As Dr. Rausch was talking, he brought up a problem that we all have recognized and formulated many times. He was talking about the power dam which would interfere with a great deal of the fish life, which has been individually justified, but which still adds up to a considerable damage. Now perhaps we can find ways to convince others outside through the people who learn at these conferences how serious the problem is. Let us reverse this business of justifying small individual parcels of invasion. Big business is developing a sort of pocket morality or dollar ethics. They find that they can take a small part of their income and apply it to public good of one kind or another to improve their public relations and ultimately their business. Can we find ways of persuading the people who would exploit what ought to be unchanged that they can justify the exclusion from their operation of small portions here and there of caribou range—or whatever it may be, down to the surroundings of a small pond on which you will find natural studies worthwhile—can they be persuaded that out of the two operations they may for public benefit justify small exclusions, those small exclusions adding up eventually to something that would be significant to the people who are trying to preserve a natural world?

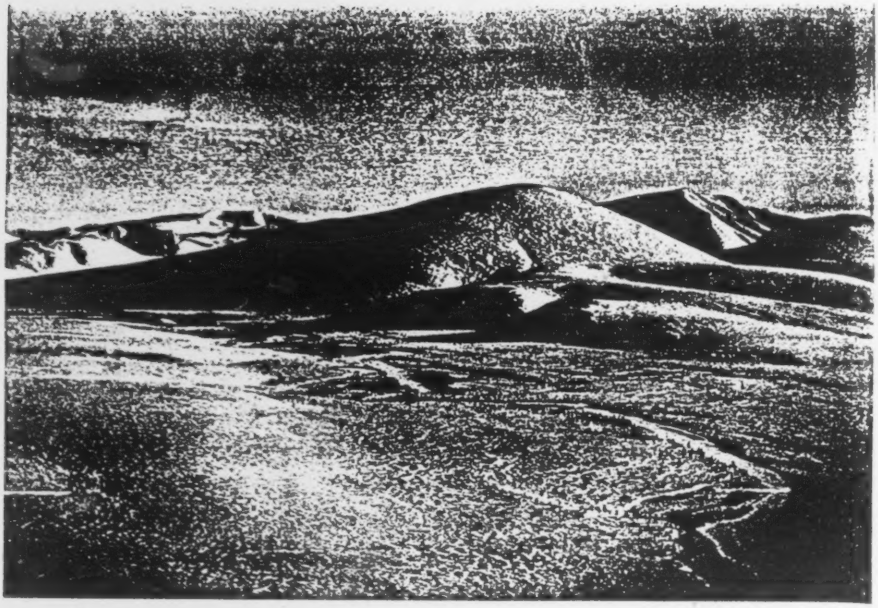
Leonard: That is being done to a certain extent by some of the larger timber-owning companies in their program of public shooting and park areas, but it is really a fine suggestion to be used by industry all throughout the nation.

NORTHEAST ARCTIC

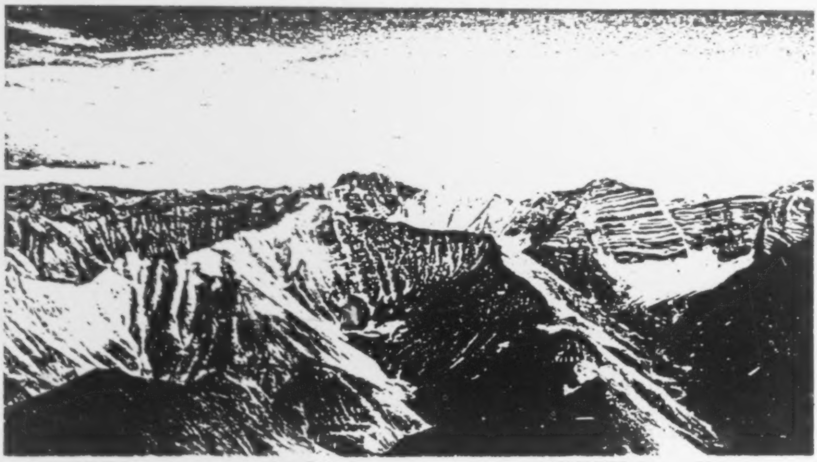
The Last Great Wilderness

The setting aside of a part of the original Arctic wilderness would be one additional long and significant step toward further understanding and use of the Northland's biological wealth; it would preserve one of the most valuable continental wildlife breeding areas—one of the great scenic and historic regions of North America

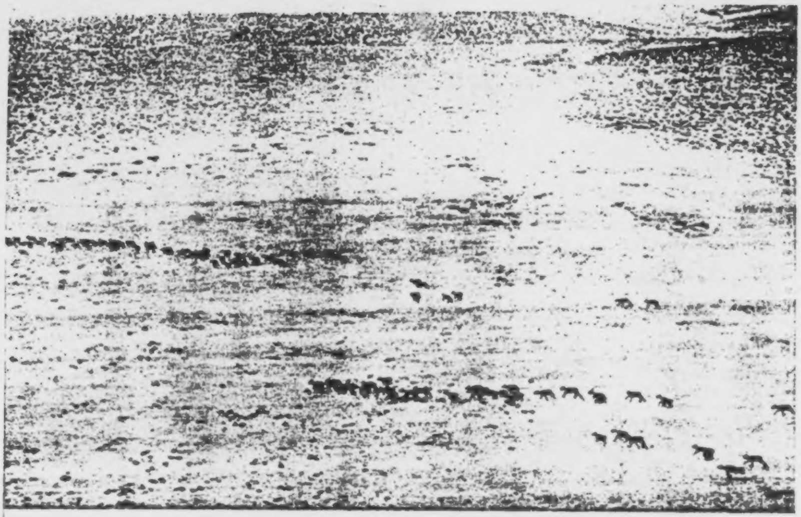
PHOTOGRAPHS BY LOWELL SUMNER



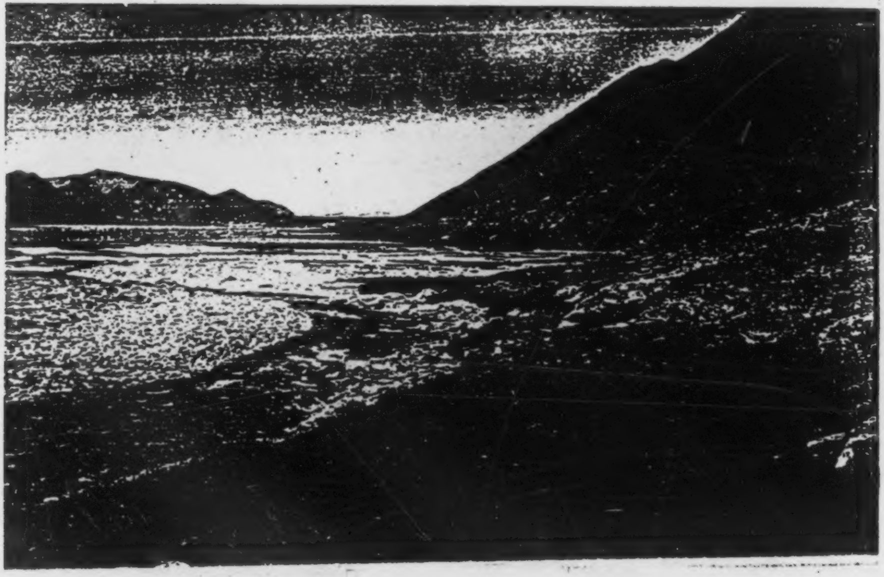
Only on the Firth River do special climatic conditions permit forest trees to extend to the Arctic coast. . . . The remote and little known Brooks Range resembles the Rocky Mountains in majesty and scale.

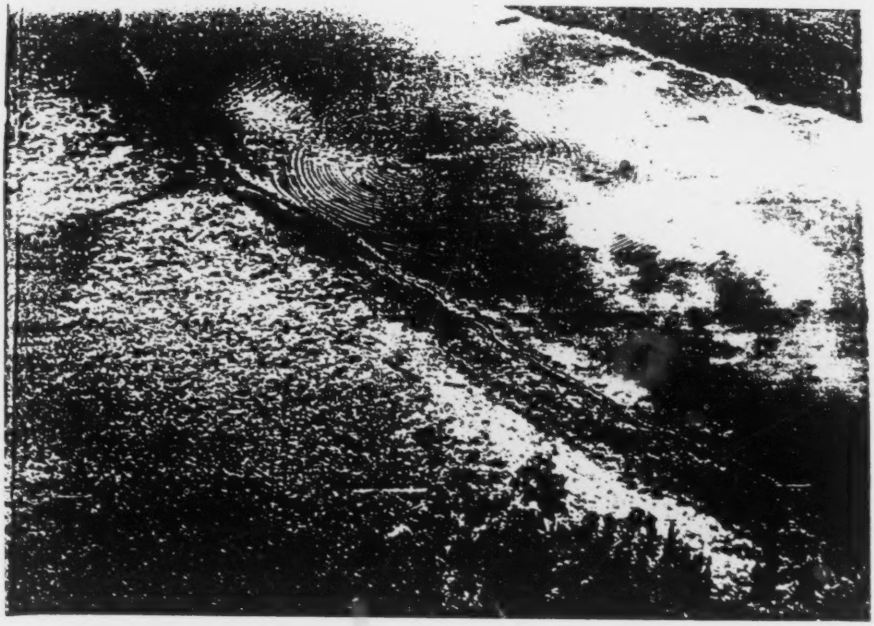


The adjacent lake wilderness of Old Crow is considered one of the great game regions of the continent. . . . The broad Firth River Valley, here shown at the junction of Mancha Creek (foreground) is a highway for game today, and probably once served for man.



The largest caribou bands remaining in Alaska inhabit the vast Arctic plains. . . . Like the buffalo of 100 years ago, the great caribou bands have made "roads" through the country.

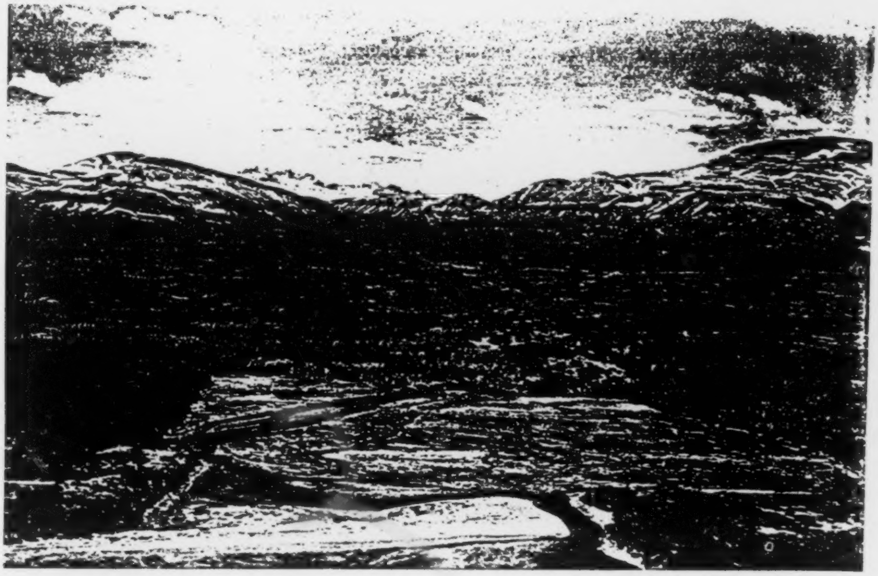




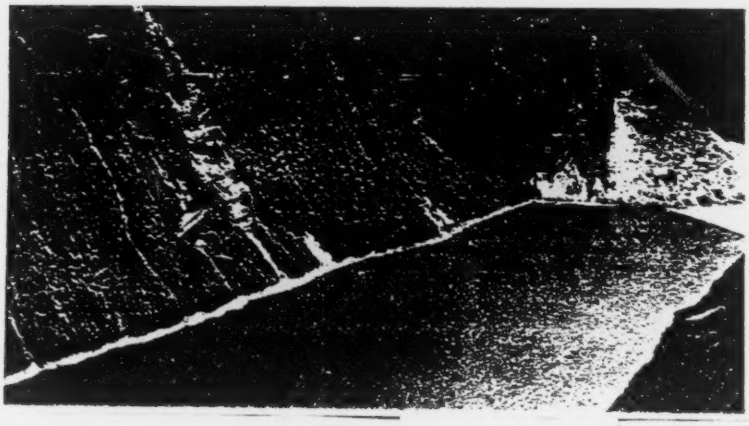
Rivers on the south side of the Brooks Range afford typical moose habitat of the Yukon drainage and here the animals have not been disturbed. . . . Over hundreds of square miles the open slopes are interlaced with game trails.

This native village of Old Crow, like the historic trading post of Fort Yukon, constitutes one of the gateways to the Arctic wilderness area. . . . A typical Arctic river winding to the polar sea.

Cave area on the Firth. The geographic location, gentle topography, and unusually mild climatic conditions lead to the belief that the archeological potentialities of the area are exceptionally rich and significant. . . . Within this region are hundreds of lakes where moose, bears, wolverines, waterfowl, and fish live undisturbed.



Dakavak Bay was protected from the eruptions by ridges. In its friendly valley we saw the first of many Alaska brown bears. . . . At Geographic Harbor's upper end there is a fresh-water lake. The enclosing walls are so steep it is almost incredible that they could be densely clothed with alders.



These low, glaciated promontories guard the entrance to Geographic Harbor, but there are channels deep enough for large vessels to enter. . . . Around Kukak Bay, spires of rock are favorite sites for the great stick nests of American eagles. Accustomed to supremacy in the air, they watched us, like this one whose white head is visible in the nest, but did not fly away.

FLOWER-DOTTED ARCTIC MEADOWS SURROUNDING LAKES LIKE SCHRADER AND PETERS ARE NESTING GROUNDS OF WILDFOWL THAT WINTER IN THE UNITED STATES

APPENDIX IV

From the Fourth World Wilderness Congress
Denver and Estes Park, 1987

Resolution calling for a United Nations Conference on Environmental Restoration in 1992, and for member nations to establish Environmental Restoration Services or Commissions.

[NOTE: The resolution passed by consensus in a shorter form. The original draft herein includes the preamble, describing the need for the resolution.

Secretary of the Treasurer James Baker addressed the World Congress, which was attended by representatives from fifty-eight nations and by 1800 individuals in all. He called for a new World Bank approach to Third World debt. Investment in restoration would be such an approach.

Secretary of the Interior Don Hodel has proposed an admirable example, calling for the restoration of Hetch Hetchy Valley to Yosemite Naional Park.

Sustainable economic growth and development could benefit from restoration and preservation, which are mutually self-supporting.]

RESOLUTION ON ENVIRONMENTAL RESTORATION

Estes Park, Colordo, September 14, 1987
Resolution on Restoration
(pursuant to the Denver Declaration)

PREAMBLE

THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT in Stockholm in 1972 brought global recognition to the need for reform in human attitudes toward the environment. The United Nations Environment Programme and its subprograms resulted. Many people soon felt that environmental protection needed to be linked to economic growth and development. Belief is now widespread that economic growth and sustainable development are inseparable from environmental protection.

The questions not covered in detail at the Fourth Wilderness Congress are these:

1) What can economic growth be based upon and what can sustainable development consist of on a limited earth?

2) How much of the economic growth and development since the Industrial Revolution have been dependent upon the mining of nonrenewable and renewable resources?

3) If the basis of economic growth and development in the past has depended upon resources that are being exhausted, what must the new growth and development consist of if they are indeed to be sustainable?

It is axiomatic that there can be an environment without an economy [the environment existed for more than four billion years before the first economist appeared] but there can be no economy without an environment. Environmental destruction is widespread and is accelerating.

An important and virtually untested way to determine the extent and the reversibility of environmental impairment and destruction is to undertake to restore those elements that have been impaired or destroyed. Is restoration possible and economically feasible, in whole or in part? The effort to determine this, to find what resources of science, technology, and human genius and spirit are available and what they cost, is an obligation to the future. It can determine what course the human family, now rapidly becoming aware of what its past has cost the earth and the future now ought to follow. We are less likely to destroy what we cannot afford to restore--including a future for our chldren.

Several times the Congress has heard words related to restoration-- heal, redeem, recover, and rehabilitate. What these words connote was not dwelt on. The word restoration places heavy demands on us, if we remember the effort to put Humpty Dumpty together again, but we ought not back away from the demands.

Maurice Strong has said that the Stockholm Conference of 1972 would have been worthwhile even if it had not been held, owing to the study and exchange of ideas required of those around the world who prepared for the conference. It is now urgent to proceed beyond the Stockholm declarations.

RESOLUTION

DAVID R BROWER,40 STEVENSOON AVE BERKELEY CA 94708(415)841 8296

NOW THEREFORE BE IT RESOLVED:

1) that the United Nations be urged to begin preparation for a Conference on Environmental Restoration in 1992, to celebrate the twentieth anniversay of the Stockholm Conference of 1972 and to ascertain the environmentally feasible routes to economic growth and sustainable development throughout the world that will respect and protect the irreplaceable resources of information that exist in the remaining living wilderness of the world;

2) that the individual governments participating in the United Naions be urged to establish agencies or services (a) to further the preparation for the conference and (b) to advise their respective governments of interim courses of action to preserve the opportunity to carry forward the recommenations of the Conference on Restoration;

3) that nongovernmental organizations be urged to support this resolution vigorously;

4) that the Executive Committee of the Congress appoint a committee to follow up on this resolution [this was deleted from the final resolution, there being no standing committees of the Wilderness Congress]; and

5) that the media inform the public of this resolution and participate in the preparation for the conference and in covering its deliberations and conclusions.

[An informal committee (the Closers of the Bar) drafted the resolution and David Brower submitted it in behalf of Earth Island Institute, supported by delegates from several organizations]

APPENDIX V

From "Our Common Future," the World
Commission on Environment and
Development (Oxford Univ. Press, 1987)

OUR COMMON FUTURE

THE REPORT OF THE WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT

Most of today's decision makers will be dead before the planet suffers the full consequences of acid rain, global warming, ozone depletion, widespread desertification, and species loss. Most of today's young voters will be alive.

The World Commission on Environment and Development, headed by Gro Harlem Brundtland, Prime Minister of Norway, was set up as an independent body in 1983 by the United Nations. Its brief was to re-examine the critical environment and development problems on the planet and to formulate realistic proposals to solve them, and to ensure that human progress will be sustained through development without bankrupting the resources of future generations.

Our Common Future serves notice that the time has come for a marriage of economy and ecology, so that governments and their people can take responsibility not just for environmental damage, but for the policies that cause the damage. Some of these policies threaten the survival of the human race. They can be changed. But we must act now.

This is the most important document of the decade on the future of the world.

DAVID R BROWER.40 STEVENSOON AVE BERKELEY CA 94708(415)841 8296

Below are excerpts from Chairman Gro Harlem Brundtland's foreword to Our Common Future

* * * * *

We live in an era in the history of nations when there is greater need than ever for co-ordinated political action and responsibility. The United Nations and its Secretary-General are faced with an enormous task and burden. Responsibly meeting humanity's goals and aspirations will require the active support of us all.

My reflections and perspective were also based on other important parts of my own political experience: the preceding work of the Brandt Commission on North-South issues, and the Palme Commission on security and disarmament issues, on which I served.

I was being asked to help formulate a third and compelling call for political action: After Brandt's *Programme for Survival* and *Common Crisis*, and after Palme's *Common Security*, would come *Common Future*. This was my message when Vice Chairman Mansour Khalid and I started work on the ambitious task set us by the United Nations. This report, as presented to the UN General Assembly in

There was a time of optimism and progress in the 1960s, when there was greater hope for a braver new world, and for progressive international ideas. Colonies blessed with natural resources were becoming nations. The ideals of co-operation and sharing seemed to be seriously pursued. Paradoxically, the 1970s slid slowly into moods of reaction and isolation while at the same time a series of UN conferences offered hope for greater co-operation on major issues. The 1972 UN Conference on the Human Environment brought the industrialized and developing nations together to delineate the 'rights' of the human family to a healthy and productive environment. A string of such meetings followed: on the rights of people to adequate food, to sound housing, to safe water, to access to means of choosing the size of their families.

The present decade has been marked by a retreat from social concerns. Scientists bring to our attention urgent but complex problems bearing on our very survival: a warming globe, threats to the Earth's ozone layer, deserts consuming agricultural land. We respond by demanding more details, and by assigning the problems to institutions ill equipped to cope with them. Environmental degradation, first seen as mainly a problem of the rich nations and a side effect of industrial wealth, has become a survival issue for developing nations. It is part of the downward spiral of linked ecological and economic decline in which many of the poorest nations are trapped. Despite official hope expressed on all sides, no trends identifiable today, no programmes or policies, offer any real hope of narrowing the growing gap between rich and poor nations. And as part of our 'development', we have amassed weapons arsenals capable of diverting the paths that evolution has followed for millions of years and of creating a planet our ancestors would not recognize.

When the terms of reference of our Commission were originally being discussed in 1982, there were those who wanted its considerations to be limited to 'environmental issues' only. This would have been a grave mistake. The environment does not exist as a sphere separate from human actions, ambitions, and needs, and attempts to defend it in isolation from human concerns have given the very word 'environment' a connotation of naivety in some political circles. The word 'development' has also been narrowed by some into a very limited focus, along the lines of 'what poor nations should do to become richer', and thus again is automatically dismissed by many in the international arena as being a concern of specialists, of those involved in questions of 'development assistance'.

But the 'environment' is where we all live; and 'development' is what we all do in attempting to improve our lot within that abode. The two are inseparable. Further, development issues must be seen as crucial by the political leaders who feel that their countries have reached a plateau towards which other nations must strive. Many of the development paths of the industrialized nations are clearly unsustainable. And the development decisions of these countries, because of their great economic and political power, will have a profound effect upon the ability of all peoples to sustain human progress for generations to come.

Many critical survival issues are related to uneven development, poverty, and population growth. They all place unprecedented pressures on the planet's lands, waters, forests, and other natural resources, not least in the developing countries. The downward spiral of poverty and environmental degradation is a waste of opportunities and of resources. In particular, it is a waste of human resources. These links between poverty, inequality, and environmental degradation formed a major theme in our analysis and recommendations. What is needed now is a new era of economic growth—growth that is forceful and at the same time socially and environmentally sustainable.

We therefore come from widely differing backgrounds: foreign ministers, finance and planning officials, policymakers in agriculture, science, and technology. Many of the Commissioners are cabinet ministers and senior economists in their own nations, concerned largely with the affairs of those countries. As Commissioners, however, we were acting not in our national roles but as individuals; and as we worked, nationalism and the artificial divides between 'industrialized' and 'developing', between East and West, receded. In their place emerged a common concern for the planet and the interlocked ecological and economic threats with which its people, institutions, and governments now grapple.

During the time we met as a Commission, tragedies such as the African famines, the leak at the pesticides factory at Bhopal, India, and the nuclear disaster at Chernobyl, USSR appeared to justify the grave predictions about the human future that were becoming commonplace during the mid-1980s. But at public hearings we held on five continents, we also heard from the individual victims of more chronic, widespread disasters: the debt crisis, stagnating aid to and investment in developing countries, falling commodity prices and falling personal incomes. We became convinced that major changes were needed, both in attitudes and in the way our societies are organized.

The questions of population—of population pressure, of population and human rights—and the links between these related issues and poverty, environment, and development proved to be one of the more difficult concerns with which we had to struggle. The differences of perspective seemed at the outset to be unbridgeable, and they required a lot of thought and willingness to communicate across the divides of cultures, religions, and regions.

Another such concern was the whole area of international economic relations. In these and in a number of other important aspects of our analysis and recommendations, we were able to develop broad agreement.

The fact that we all became wiser, learnt to look across cultural and historical barriers, was essential. There were moments of deep concern and potential crisis, moments of gratitude and achievement, moments of success in building a common analysis and perspective. The result is clearly more global, more realistic, more forward-looking than any one of us alone could have created. We joined the Commission with different views and perspectives, different values and beliefs, and very different experiences and insights. After these three years of working together, travelling, listening, and discussing, we present a unanimous report.

* * *

Commission now addresses itself. In so doing we speak to people directly as well as to the institutions that they have established.

The Commission is addressing governments, directly and through their various agencies and ministries. The congregation of governments, gathered in the General Assembly of the United Nations, will be the main recipient of this report.

The Commission is also addressing private enterprise, from the one-person business to the great multinational company with a total economic turnover greater than that of many nations, and with possibilities for bringing about far-reaching changes and improvements.

But first and foremost our message is directed towards people, whose well-being is the ultimate goal of all environment and development policies. In particular, the Commission is addressing the young. The world's teachers will have a crucial role to play in bringing this report to them.

If we do not succeed in putting our message of urgency through to today's parents and decision makers, we risk undermining our children's fundamental right to a healthy, life-enhancing environment. Unless we are able to translate our words into a language that can reach the minds and hearts of people young and old, we shall not be able to undertake the extensive social changes needed to correct the course of development.

The Commission has completed its work. We call for a common endeavour and for new norms of behaviour at all levels and in the interests of all. ~~The changes in attitudes, in social values, and~~ in

The process that produced this unanimous report proves that it is possible to join forces, to identify common goals, and to agree on common action. Each one of the Commissioners would have chosen different words if writing the report alone. Still, we managed to agree on the analysis, the broad remedies, and the recommendations for a sustainable course of development.

In the final analysis, this is what it amounts to: furthering the common understanding and common spirit of responsibility so clearly needed in a divided world.

* * * * *

Thousands of people all over the world have contributed to the work of the Commission, by intellectual means, by financial means, and by sharing their experiences with us through articulating their needs and demands. I am sincerely grateful to everyone who has made such contributions. Many of their names are found in Annexe 2 of the report. My particular gratitude goes to Vice Chairman Mansour Khalid, to all the other members of the Commission, and to Secretary General Jim MacNeill and his staff at our secretariat, who went above and beyond the call of duty to assist us. Their enthusiasm and dedication knew no limits. I want to thank the chairmen and members of the Intergovernmental Inter-sessional Preparatory Committee, who co-operated closely with the Commission and provided inspiration and support. I thank also the Executive Director of the United Nations Environment Programme, Dr. Mostafa Tolba, for his valuable, continuous support and interest.

Gro Harlem Brundtland
Oslo, 20 March 1987

The CHAIRMAN. Thank you very much, Mr. Brower. Thank you also for your publications. I look forward to reading those.

And I also might say I hope this is not your last trek up the steep slopes of Capitol Hill. I know it is gusty up here, but it's not too dangerous if you're careful.

Mr. BROWER. I use oxygen. [Laughter.]

The CHAIRMAN. Mr. Brower, if the Congress was so rash as to approve legislation opening up the ANWR and we were able to get hefty amounts of money from the Federal Government, I hope you would not oppose my move to secure a large part of that for development of national parks, wildlife refuges, national forest and BLM lands.

Mr. BROWER. I think that what we would want to have happen there was what our original purpose was in the Sierra Club, that our Serengeti Plains up there should be a national park, the whole thing.

And I think that what—I have also in my speech here a resolution that I got through the World Wilderness Congress in Denver last month calling for a United Nations conference on environmental restoration and calling also for the governments in the United Nations, including ours, to set up either an office, a commission or the equivalent on environmental restoration because I think if we make the effort and go to the expense of restoring some of the things we have already messed up, including the Prudhoe Bay area, we will find that it is too expensive—we cannot afford to make further environmental degradation our route to success. We will find that we can build a growing economy on putting the world back together that our eagerness has taken apart.

The CHAIRMAN. I want to give any of our witnesses this morning an opportunity to suggest how this Murkowski bill might be improved. I suppose the best way to improve it in your view is to defeat it, but if there is anything short of that you would like to share with the committee, we would be delighted to hear from you.

[Pause.]

Mr. BROWER. Do you remember that Daily News headline? That was the most famous headline of all. "U.S. to City: Drop Dead." [Laughter.]

The CHAIRMAN. I think that pretty well sums it up.

Ms. MILLER. I would say you would have to kill it. I mean, based on false assumptions, which I have tried to bring out a couple of them, and we could go through each one, A, B, C, D, E, F, in the basis for the proclamation of the bill, I think they are all false assumptions based upon my research and as a 12 year Alaskan resident. I don't believe that we are anywhere near ready to considering opening up the refuge.

The CHAIRMAN. Senator Murkowski.

Senator MURKOWSKI. Well, first of all, I want to compliment the panel for expressing their view. I think that they have done it in a manner which—they have very clearly conveyed their position. And I guess, Mr. Chairman, it is fair to say it is not a position of input in the sense of constructive recommendations on the legislation, but rather the exact opposite as the silence of a few moments ago indicated. And of course, you certainly have that right, and I certainly respect it.

Of course, the intent of the bill is to try and address in an open forum how we can concern ourselves and recognize the environmental concerns as well as numerous other concerns. And I think as we reflect on the merits, that particularly my two friends from Alaska and constituents recognize there is more to this than just the question of opening up ANWR, but there is a question of dividing the spoils.

And the Chairman and I have a little difference of opinion on the formula that is currently in existence where the State of Alaska shares 90 percent and the Federal Government shares 10. And there is a potential alternative proposal that would suggest that if indeed ANWR is opened up, that that split be changed from 90-10 to 50 for the State of Alaska, 25 for the Federal Government and 25 for the basic conservation/reclamation effort which has been responded to by Mr. Brower. There is some interest in—but I just simply want to note this for the record because if there is substantial quantities of oil reserves there, why, the question of who will be the benefactor is something that I think we as Alaskans all have to reflect on as the merits of that reality.

Ms. HUNTER. I think, Senator Murkowski, there is a third option that you are not considering also which is definitely before the Congress, and that is the one that is initiated by the Interior Department in which they propose to trade off the subsurface rights of ANWR to various native organizations in exchange for land for in-holdings within the different refuges throughout Alaska. And I think that this is a pretty bare-faced attempt on the part of the oil companies and the Department of Interior to co-op the support of the natives by offering them up-front money to go in and to relinquish their land claims close at hand in exchange for hopes of getting rich on the Arctic National Wildlife Refuge. And of course, if that happens, both the Federal Government and the State are going to be left holding the bag.

Senator MURKOWSKI. I think you can question the motivation. I think the Chairman has attempted to keep the hearings on the issue of should or shouldn't we allow leasing in ANWR, and the matter of exchanges is fraught with all types of concerns by various members of this committee, as it appropriately should be.

I am going to conclude, Mr. Chairman, simply by recognizing that we indeed have a substantial difference here on the majority of the committee in indicating the momentum and the direction of this committee with regard to ANWR which was to accept testimony in a constructive manner on how to proceed, and the realization that those who are in opposition to it have clearly enunciated their position, as they should.

I would hope to moderate my intent for the benefit of the witnesses——

Ms. MILLER. How would you do that? How would you propose to do——

Senator MURKOWSKI [continuing]. In the sense of recognizing that we have a tremendous area in the Arctic National Wildlife Refuge, an area as we all know of about 18.9 million acres, of which we have committed approximately 8 million acres, or 42 percent, to a designated wilderness. And that's a substantial area. The coastal plain, the 1002 area we are talking about, is a million and a half acres, and as has been determined by previous witnesses, there is reasonable reason to think that if indeed it is leased, and if indeed there are substantial reserves there, the footprint will be smaller than Prudhoe Bay. And I would hope that we would, during the course of development of this legislation, be able to bring in certain provisions to have that assurance.

The fact is that out of that remaining figure of approximately 8 million acres that are set-aside in refuge, while there is no assurance that development could not possibly occur, the likeliness is that it perhaps wouldn't occur.

So, what we are talking about is the merits of approximately 12,000 acres which would be utilized by drill pads and roads and so forth, and the question of whether as a bottom line this kind of a compromise, which has effectively been drafted as specifically a compromise, is in the best interests of not only our State of Alaska, but our Nation as well as we look to the realities associated with our energy security interests.

And I would, in conclusion, simply welcome my Alaskan constituents to feel free to visit our staff, visit our office, continue to talk with us because we appreciate your point of view, and want to thank you for your testimony.

Thank you, Mr. Chairman.

Mr. **Brower**. Senator Murkowski, I hope that you will consider, after reading these books, putting your legislation in a time capsule. [Laughter.]

Senator **Murkowski**. I've already put some of it in a time capsule. I don't know whether it will leak or not.

Ms. **Miller**. Are you appreciative enough to withdraw your bill at this time? [Laughter.]

Senator **Murkowski**. I think I have already explained the purpose of my bill, and you very diligently explained your point of view. And I think we have had a good morning.

The **Chairman**. We were thinking of putting Senator Murkowski in a time capsule. [Laughter.]

Senator Wirth.

Senator **Wirth**. Thank you, Mr. Chairman.

You had generously suggested at the time of dismissing the last panel that if we had questions for any of them who might still be here, we might ask them to come back. Would that be possible? Like Ms. Sheldon or Ms. Speer—are they still here?

The **Chairman**. I think Ms. Speer is here, yes.

Senator **Wirth**. Is Ms. Sheldon still here too? Could you all join us for a few minutes? I don't think we really had an opportunity to address several issues.

While they are being seated, Mr. Chairman, let me just make a few comments related to part of the last exchange in which there was discussion about "dividing the spoils."

If I might, Mr. Chairman, it seems to me that from the perspective of many of us, that is precisely the problem and the attitude that makes this as severe an issue as it is. The notion that as we consider this very important project that the concerns should be "dividing the spoils," reminds me a little bit of sort of junior high school histories of the rape of the Sabine or of Roman legions coming back with loot from around the world, the then-known world, to enrich a few in Rome. That is precisely what we should not be doing and precisely what the perspectives are that many of us carry in this, that we have to be a lot more balanced in our approach to this.

Leaving that aside, let me, if I might, focus on your request that we try to look at the legislation and note what constructive suggestions might be made, which is why I wanted to have some of our previous witnesses come back.

First of all, you all have copies of the legislation I am sure. If you might go to page 9 of the legislation, line 8 through 21, which reads: "The coastal plain resource assessment of April 1987 prepared by the Secretary pursuant to section 102(h) of the Alaskan National Interest Lands Conservation of Act of 1980, and the legislative environmental impact statement incorporated into the coastal plain resource assessment pursuant to the National Environmental Policy Act of 1969 shall satisfy all legal requirements under those laws with respect to any action taken to develop rules and regulations and procedures for a competitive oil and gas leasing program or to conduct particular lease sales on the public lands within the coastal plain. No further studies, reports or assessments shall be required before the Secretary or other appropriate Federal officials may take such action."

Now, in response to the question that has been posed throughout these hearings of assessing the existing legislation—is that adequate legislative language, or would you propose that there be changes in that language? Maybe I might ask perhaps the two legal experts who deal with this all the time. Ms. Speer and Ms. Sheldon I know deal with these issues on a steady basis, and I might ask the two of you if you might give us a reaction to that.

Ms. SPEER. Sure. I am not a lawyer. I should just make it clear. Although I do deal with leasing programs around the country, I am not a lawyer.

But it does seem to me that this bill is—given that most people agree that this area is a very special and sensitive area, it seems to me that the bill is going in the wrong direction, that NEPA requirements at the pre-lease stage are typically applied on off-shore leases certainly, and in addition to a programmatic EIS, which is done at the five year program stage, I see absolutely no reason to exempt the coastal plain from similar requirements. And in fact, if anything, I would advocate a tightening of the existing NEPA requirements rather than a loosening of them.

And I think it is particularly important given the very serious deficiencies in the LEIS that was prepared by the Secretary. We note that cumulative impacts, for example, were not adequately analyzed. Air pollution was not dealt with in a comprehensive way. Hazardous waste disposal and the consequences of underground injection which has been the means of eliminating some 200 billion gallons of waste on the north slope—none of these issues were really adequately analyzed. The Interior Department spent five years looking at caribou in ANWR. While that is important, I think they also should have spent five years looking at what exactly has happened at Prudhoe.

Senator WIRTH. So, you would not agree with the language that says that "No further studies reports or assessments shall be required."

Ms. SPEER. That's correct.

Senator WIRTH. Do you have any reaction to that? You are a lawyer, isn't that correct?

Ms. SHELDON. Yes, I am a lawyer, Senator Wirth.

Senator WIRTH. You deal with these issues.

Ms. SHELDON. With distressing regularity. [Laughter.]

I have already indicated in commenting to Senator Johnston that I had deep concerns about the NEPA compliance aspects of this bill and that I saw the language in the bill as representing a substantial weakening of the application of the National Environmental Policy Act to this very important project.

So, I would recommend basically excising this portion and replacing it with a different kind of NEPA compliance schedule. I think that the first thing we need is a programmatic environmental impact statement which does do the job that the 102 report was designed to do but unfortunately did not accomplish. And EPA has noted, as I indicated earlier, that this impact statement is not sufficient.

We need to gather the very basic data so that we can analyze the impacts of oil and gas leasing in this region. The LEIS is a catalog at present of species and adescription of the environment and so on, but it doesn't do what NEPA commands agencies to do and that is to identify and evaluate the potential environmental impacts resulting from a proposed action. I would say that we are going to need a variety of environmental analyses if we are to proceed with exploration and development in the coastal plain. We need the underlying data and then we are going to have to examine in great detail the site specific effects of proposed lease actions.

And if we let the horses out of the barn by relying on what we have now, it is going to be very, very hard to do anything about it later. So, our fundamental NEPA inquiry has to be made before any commitments of resources are made or alternatives foreclosed. And then a decision based on that impact statement will be a reasonable one. And that impact statement should allow for the possibility of deciding to refrain from leasing altogether or to make decisions about where leasing might be accommodated. In our view, as you know, we don't think there is going to be areas where leasing can be accommodated. That's the purpose of NEPA. That purpose is being frustrated by this language.

Senator WIRTH. Would it be possible for you, Ms. Sheldon, to provide to me the language that you think ought to be in any legislation to be considered by this committee and by the full Senate?

Ms. SHELDON. I could certainly take a crack at it.

Senator WIRTH. We would really appreciate that, and I would look forward to seeing that.

Let me go to some more specifics related to the broad question that I'm going after.

When Secretary Hodel testified before us in June, I asked him at that time about some of the significant changes that had been made in the EIS between the time it was prepared in its draft form and when it was sent to Congress in final form.

For example, while the draft referred to category 1 habitat—that's habitat defined as being unique and irreplaceable, as I understand it—the final EIS omitted all references to category 1 habitat. At least I couldn't find any in the final EIS. Maybe I missed it.

Another example was that the final EIS dropped the phrase "core calving areas," a concern to I think all of you, and substituted another phrase, "concentrated calving areas." There are a variety—a whole series of changes apparently that were made between the draft and the final EIS.

Cumulative impacts was yet another where there was scant reference in the draft, a little more reference, in fact, I think in the final EIS.

I asked the Secretary to comment on all of this. And we have not heard back from him yet. I would suspect that they are working on it at this point.

Do you have any thoughts on how all of these changes got made, what kind of a process occurred between the draft and the final, and who made those decisions and for what reasons? I don't know. Ms. Speer, I don't know if you have any experience with that. Do you?

Ms. **Speer**. The changes that were made between the DEIS and the FEIS were, indeed, as you say, dramatic and quite disturbing to us. We feel that at a minimum the Department ought to go back and reassess its decisions and make it clear what percentage of the caribou herd will be affected the way it did in the draft EIS. Those decisions appear to be politically based to us although there may be some other reason.

Senator **Wirth**. Would that kind of a reassessment be allowed under the language of the legislation in front of the committee?

Ms. **Speer**. No, it doesn't appear to be the case.

Senator **Wirth**. So, we wouldn't know why the discrepancies exist between what was in the draft and what was in the final if we enacted the language that is in the committee now.

Ms. **Speer**. Yes, I think that's correct.

Senator **Wirth**. Is that true, Ms. Sheldon? Again, you are our good counsel here to help us out.

Ms. **Sheldon**. Thank you.

That would appear to be true from looking at the language. The legislation says that the impact statement that has been produced to date shall satisfy all legal requirements under NEPA and the other identified laws. That's the end of the inquiry. That document will stand as the environmental analysis basis for the activities which will then be permitted.

And that's the problem. It's a very weak basis for making decisions about exploration and development activities. And even if you do cite specific analyses later on on particular aspects of it, you are going to be working off of a very certain foundation, and you are not going to have the opportunity to examine the differences between the draft and the final.

And I think what those changes indicate to me is that once again you can finagle with language. By changing words you can make substantial changes in the environmental impact. And it doesn't appear from the language precisely that that is what is going to happen, but in fact it will. And that's the problem with relying on something that is embodied in a document as vague as this. There are no quantifiable criteria or standards to work against.

Senator **Wirth**. I gather that you are not satisfied with the analysis of the impacts on air quality or the cumulative impacts of oil exploration or the impacts on wildlife.

Ms. **Sheldon**. That's correct. I don't think there is any analysis or very, very little.

As I said, the document catalogs what is there in the environment. But we have a lot of experience with oil and gas exploration and development activities both in the arctic and in the lower 48. And the duty of the agency in complying with NEPA is to take a very close look at the interrelation of the environment in which the activities are going to take place and to project as closely as possible what the impacts will be and then to make a decision based upon that reasoned analysis based upon a true evaluation of the potential consequences. NEPA is not to be done after the fact. It is to guide decision makers. It is to make the information necessary to make decisions available at the front end and not simply as a justification for a predetermined conclusion.

Senator **Wirth**. Let me carry that a little bit further if I might. This last Tuesday an EPA witness was among the panel. As you know, the Seattle regional office of the EPA initially gave the Interior Department's analysis a failing grade. They said that pretty loud and clear, I think.

But on Tuesday EPA told this committee that they had not realized that the Department was going to do EISs at later stages of the leasing process. You're familiar with that? First of all, gave it a failing grade. Then they came back and they said, oh, we didn't realize that they were going to do an EIS later. So, we should assume that an EIS later is going to take care of all of the problems.

Now, you have had a lot of experience I know with NEPA and various oil and gas and other development projects related to that. Could you tell us why that's an appropriate answer or how that is an appropriate answer to the change from the initial failing grade to now saying, oh, we didn't realize it? What happens in that process, for the record, that might cause a problem?

Ms. **Sheldon**. I don't think that's an appropriate answer. In fact, we hear that answer all the time. Don't worry. We'll do it later. The difficulty with that in oil and gas leasing in particular—but it happens in other kinds of mineral development—is that you are then in a Catch 22 with the environment.

The rights to explore for and develop oil and gas are vested in a lessee at the leasing stage. The lease that a lessee receives tells the lessee what he is able to do. If an environmental impact statement has not preceded the vesting of those rights, it may be that we don't know what the consequences of the rights that are given to the lessee will be. If we wait until a later time to actually examine what the potential consequences are, we may have no ability or very limited ability to control, restrain or prohibit those activities.

That is the difficulty. We need to know ahead of time. Before we give the rights to explore and develop away, we ought to know what the consequences are because otherwise it is too late. If we don't do it before the lease vests those rights in the lessee, then when that lessee wishes to exercise them, it will be beyond our capability to prevent damage which we could have foreseen before the lease was issued.

I am not sure that I am making this clear.

We face this issue again and again and again. The lessee acquires the rights that he needs to explore for and develop with the lease, and if that lease is not conditioned based on our analysis of the environmental impacts, then at a time when we do look at those environmental impacts, we will lack the capability of controlling the effects. It's a Catch 22 situation.

Senator **Wirth**. What does that have to do with the legislation in front of us?

Ms. **Sheldon**. Subsection 3 at the bottom of page 9 indicates that nothing in the act shall be construed to affect the applicability of—and it should be NEPA rather than the National Environmental Protection Act—to phases of oil and gas development, production and so on, conducted subsequent to initial leasing and exploration. So, it appears that the bill contemplates that there could be environmental impact statements or environmental assessments prepared later on. But as I have said, at that point it may be too late to adequately protect the environment or to respond with controls on the operation in a way that would minimize environmental effects. And it will be too late if it will interfere with rights that we have given with the leases initially so that the best bet is always to know what you are doing before you make commitments.

And NEPA requires that. NEPA indicates that the point of trigger for an environmental impact statement is the point of commitment of resources, foreclosing of alternatives, and we will give away these resources if we allow the LEIS to stand as adequate NEPA compliance for the initial phases of this project and then only come in later on when we have a very limited range of things we can do to control the impacts.

Senator **Wirth**. Does that mean the language in section 3 on the bottom of page 9 also ought to be changed?

Ms. **Sheldon**. Yes, it should.

Senator **Wirth**. Could we ask you for any ideas you might have as to how that language ought to be changed——

Ms. **Sheldon**. Yes.

Senator **Wirth** [continuing]. Again, within the framework of—you know, what the committee by a majority agreed upon was to move ahead and try to amend and change the legislation. I think we have to have a pretty good sense of what is wrong with the existing legislation and again, in the sense of being constructive about this, what kinds of changes ought to be made.

Can I ask you another question? The assumption it seems to me in the legislation is that the standards of the current Clean Air Act and the Clean Water Act are adequate to protect wildlife. Is that your understanding of the assumptions in the legislation? And if in fact that is the assumption in the legislation, are the standards of the Clean Air and the Clean Water Act adequate to protect wildlife resources?

Ms. **Sheldon**. The assumptions are that the standards are adequate. I think that I am not the best person to respond to that question. Lisa Speer, who is a biologist, rather than a lawyer, has looked at that precise issue in compiling the report that NRDC did on the effects of Prudhoe Bay. And she testified about that this morning. So, I think that she ought to answer.

Ms. **Speer**. Yes. I think that is a really important question to be asked.

With respect to the Clean Air Act, the EPA has raised questions about whether acidification of the tundra is occurring even though ambient standards that were established under the Clean Air Act are being met. And there have been questions raised by other agencies whether those standards are really adequate to protect arctic species. ADEC, for example, believes that arctic vegetation is more sensitive to air pollutants than the mid-latitude species that were used to develop those standards. So, I think that is a real question with air pollution.

The Clean Water Act—GAO just came out with a report called "National Wildlife Refuge is Difficult to Contain and Clean Up." And in there they cite the fact that EPA has not set criteria that could be used to specifically protect wildlife or refuge habitat so that the Fish and Wildlife Service has a very difficult time telling what standards they should impose to, in fact, protect wildlife and refuges.

So, I think those are two very important questions that should be addressed by this legislation.

I would also just like to add something about NEPA. It seems to us that if the Department's EIS is fully, legally adequate, then it should go forward. If it is not, then it should not be shielded from litigation by this act.

Senator **Wirth**. Let me ask you just one final question. We have heard a lot about reclamation. What do we know about reclamation in an environment like that we are considering, and how expensive is reclamation in an area like that?

Ms. **Speer**. Again, I think those are important questions.

Reclamation is in its infancy in the arctic. Both EPA and the Corps have commented that very little is known about the ability of the industry to successfully restore developed areas in the arctic. There have been some small reclamation efforts that have been undertaken by the industry, but their long-term success is unknown.

And a troubling aspect of this is the tremendous cost of reclamation. The Alaska Oil and Gas Association, for example, estimated that to reclaim exploratory facilities would cost 1.2 to 2 times the amount that it cost to build the facility to begin with. And Chevron, for example, estimated that to revegetate just one reserve pit at the KIC well would cost $200,000.

Where is all this money going to come from? The State only requires bonds of—I think it's $100,000 per lease or $500,000 statewide.

Senator **Wirth**. What's the answer? Where is the money going to come from?

Ms. **Speer**. That is the question. We are very concerned. This is a tremendous undertaking. There are hundreds of miles of roads and hundreds of pads and reserve pits all over the north slope that are——

Senator **Wirth**. Well, should we be writing into the legislation some broader requirements related to reclamation?

Ms. **Speer**. Well, it seems to me that the first step is to prove that reclamation is possible, to figure out whether in fact it can be done before we enter the Arctic National Wildlife Refuge, and that that ought to be one of the preconditions, that the industry first demonstrate that it can restore things over the long term successfully, and secondly, that it can comply fully with the laws and regulations of the United States and the State of Alaska.

Senator **Wirth**. Is language to that effect adequately laid out in the legislation?

Ms. **Speer**. No. I may have missed it in here, but I did not see anything about restoration of developed sites in this legislation.

Senator **Wirth**. Could you do me the favor of going back through this, and if you do not think that the reclamation language is adequate, could you send me a draft of whatever ideas you think would be appropriate?

Ms. **Speer**. I'll take a crack at it.

Senator **Wirth** [presiding]. That would be very helpful.

Just finally, I have been handed the gavel to suggest that not only are there no other members of the committee here but that it's probably time to fold our tent.

I am sorry that I didn't have a chance to talk about this with Joe Fisher, but he had made the argument, you'll remember, about other resources that are available for the production of oil in Alaska alone. Plus he talked about a variety of others as well. And I would like to include in the record what I think is a very interesting analysis, an analysis done by the State of Alaska on the benefits and costs of exporting north slope crude oil.[1] Part of the argument that was made by the State of Alaska was that if we were not allowed under law to export oil to Japan and elsewhere, that would have a very dramatic impact on the production of oil in Alaska. And the State of Alaska then turned around and made reference to all of the production capacity that was being shut in in the State of Alaska.

Well, it seems to me that that very same analysis ought to apply to what is available in Alaska and what's currently there.

Now, I also asked Secretary Hodel about this when he came up in June, if he could give us a clear analysis of what energy sources were currently being drilled in Alaska, what was being produced in Alaska, what the projections were for further production in Alaska, and what would happen if the price of oil went up. We have not yet received an answer to that, but we have again sent a letter down to the Department of the Interior asking them if they would do that. And prior to receiving that, since there won't be any objection from any other members of the committee, I am going to include this particular report done by the State of Alaska in the record at this point.

Before closing out, let me ask any of you if you have any closing words that you would like to add.

Ms. **Sheldon**. I would say that we very much appreciate your questions and comments and the opportunity to add further views. I am one of your constituents and I am delighted.

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[1] The State of Alaska report was retained in committee files.

I would say that along the lines of your last comment that we now have very fancy offices at the Sierra Club Legal Defense Fund because the oil market stagnation and the economic bust in Denver has enabled us to afford to be in a building that used to be occupied by energy companies. I don't say that positively because our economy is not in great shape.

I think we can look to sources of oil in the lower 48. I am very familiar with my region, the Rocky Mountain region, and many of our national forest lands are currently leased almost 95, 98 percent of lands available for oil and gas leasing are leased. Those lands are not being drilled at present not only because of environmental opposition, although of course there is some, but because the market is not there to sustain that. So, there are sources of oil that we can look to before we look to the Arctic National Wildlife Refuge.

And while we are talking about making the record complete, I have a report of the Alaska Oil and Gas Association[1] which was given to the State of Alaska in April of this year. The association requests the State to consider removing or changing stipulations included in leases for State lands for oil and gas. Many of these stipulations and conditions are those that are recommended by the Department of the Interior for inclusion in leases in the arctic coastal plain. The association calls these onerous, unduly expensive and very difficult to comply with.

This report also includes cost figures for complying with stipulations. It indicates that mitigation is, indeed, an incredibly expensive effort and may not always be successful. So, we have based on the experience of the operators in Alaska some views about the utility of stipulations and about the economic impact of them. And I would like the committee to consider that when they consider the legislation which places such great reliance on stipulations as the way to mitigate or minimize environmental damage.

Senator WIRTH. Again, without objection, we will include that in the record.

Senator WIRTH. Thank you very much.

Ms. SHELDON. Thank you very much.

Senator WIRTH. And I am sorry that I did not realize that you were a constituent. You are advertised on the list here as being from Washington, D.C.

Ms. SHELDON. No.

Senator WIRTH. That's only your employer. Is that right?

Ms. SHELDON. The great State of Colorado.

Senator WIRTH. We all, of course, take no joy in the fact that our economy is reeling in such a way as it is in large part through the current energy crisis that we are going through. But I think that we have an obligation, and I have tried to make that clear over and over and over again in the discussions of this legislation, that we have an obligation to look at a much more balanced approach to our energy policy which includes conservation and alternatives and the whole list of options that we struggled with and came to understand during the mid-1970s. And it seems to me we ought to learn from history and not forget it.

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[1] The Alaska Oil and Gas Association report was retained in committee files.

I thank you all.

Mr. Brower?

Mr. **Brower**. Senator Wirth, just one other point. In your fair State of Colorado last month there were nine days of meetings of the Fourth World Wilderness Congress, a good part of which was reviewing this book, the Brundtland Commission report on our common future. That is headed by a Gro Harlem Brundtland, the Prime Minister of Norway, who is one of the most brilliant women I have ever encountered up until this morning.

This is described as this is the most important document of the decade on the future of the world. This report has been all but ignored by the Reagan Administration, and I hope that it is not ignored by this committee. I think that it would have a drastic effect on the form of this legislation if this were looked at. We don't have much time to make major changes in our direction if we want to be around, and it's——

Senator **Wirth**. Mr. Brower, I am very familiar with that, and also read with great interest the 50 some odd recommendations that came out of the last conference, a lot of which make a great deal of sense I think. There seemed to be some political ones in there as well, but sorting those out, that was a very impressive array.

And I was sorry not to be able to be in attendance at that, but my wife was there for most of it and had the pleasure of having dinner with you one night which you may or may not remember, but she was there for those sessions.

Mr. **Brower**. I do.

Senator **Wirth**. Thank you all very much. I appreciate your being here.

Ms. **Miller**. Can I make one more comment?

Senator **Wirth**. Please.

Ms. **Miller**. Just a couple of quick ones. I think you might have been out of the room when I was testifying part of the time, or were you here for the whole——

Senator **Wirth**. I was out of the room.

Ms. **Miller**. Okay. Just two points pertinent to one of your questions.

Just a general comment. I know you are asking for amendments and ways to improve this legislation, but in listening to all the testimony yesterday and the day before and today, I don't see how you can move forward with this legislation because there are so many unknowns that Lisa Speer has brought out today as far as reclamation and this drilling mud contaminants and so forth. There has not been a cumulative effect study. I just don't see how this bill can be improved.

Senator **Wirth**. One of the nice things about having witnesses come in is that they remind us of the substance, and then we try to figure out the politics. [Laughter.]

Ms. **Miller**. In any case, that's just a point. I don't see how we can go forward with it. I think it should be killed—the bill.

And then finally, you had one question about other sources of oil within Alaska, and you are waiting for a response from the State on that, as I understand it?

Senator WIRTH. No, the Secretary.

Ms. MILLER. The Secretary.

I would just like to—maybe your staff person will tell you, but I would urge you to get a copy of the current oil and gas lease plan for the State of Alaska which is put out every year in January of the year. The January 1986 report mentions that 13.5 million acres of on-shore lands in the Prudhoe Bay area alone will be coming up for potential lease sales over the next five years.

Now, 13.5 million acres is a lot of acreage when you are talking 1.5 million on the coastal plain of the refuge. That land has moderate potential for oil discovery, and I think that is important to note. I mean, these are lands that are adjacent to the Kuparuk field, north slope foothills. And they have high potential. So, we may have some other Kuparuks that are just right in the immediate Prudhoe Bay area where you have got to infrastructure. And you know, why not keep a commercial zone there and a green belt to the east? It makes good sense, and it's a good, balanced approach for developing our American resources.

Senator WIRTH. To all of you, thank you very much for being here. We appreciate your testimony.

And the committee will be adjourned.

[Whereupon, at 12:20 p.m., the hearing was recessed, to reconvene Thursday, October 22, 1987.]

ARCTIC COASTAL PLAIN PUBLIC LAND LEASING ACT OF 1987

THURSDAY, OCTOBER 22, 1987

U.S. Senate,
Committee on Energy and Natural Resources,
Washington, DC.

The committee met, pursuant to notice, at 9:41 a.m., in room SD-366, Dirksen Senate Office Building, Hon. Timothy E. Wirth, presiding.

OPENING STATEMENT OF HON. TIMOTHY E. WIRTH, A U.S. SENATOR FROM THE STATE OF COLORADO

Senator Wirth. If the committee would come to order.

Today the committee is continuing its consideration of legislative proposals designed to open the Arctic National Wildlife Refuge in Alaska to oil and gas leasing exploration, development and production. The bill to accomplish these purposes, S. 1217, has been introduced by Senators Murkowski and Stevens. This is the ninth hearing that the committee has conducted on the question of opening ANWR to these activities.

Today we are going to hear from a variety of witnesses, predominantly representing the conservation and environment side of the questions faced by the committee as it examines the legislation related to opening ANWR.

I greatly appreciate the Chairman's willingness to include this extensive panel, which is here at my urging and that of a number of other Senators who are, I might say—I can speak for myself in any case—increasingly skeptical about opening ANWR at a time when we are not taking the initiatives that ought to be taken on a variety of other energy proposals. But this is exactly the kind of balanced discussion that members of the committee have had, as well as the perspectives to be offered by many of today's witnesses, that will be extremely important to the committee as it attempts to better understand the ramifications of the legislation introduced by Senators Murkowski and Stevens.

And as we attempt to fulfill the mandate given us by the Chairman to constructively examine this legislation and to try to better understand how that legislation might be changed, rather than simply to look at the legislation and say that it ought to be killed altogether.

So, it would be my hope that witnesses today would, as much as possible, be constructive, as we attempted to have witnesses do last week in the response to questions that I offered, as to what ought to be done, for example, on the various technical requirements, the EPA requirements, and so on. The witnesses last week were very forthcoming in their criticism of the bill and are going to get back to us on language that they thought ought to be added to the legislation to make it more acceptable.

Because of the large number of witnesses scheduled to testify today, we would like the witnesses to limit their statements to no more than five minutes. And we will have a high-technology set of lights up here. The green runs for four minutes. The orange will then run for a minute. And with the red light I will be forced to bring down the gavel and ask that witness to conclude.

We will include the full statements in the record, and we will leave the record open for additional comments and remarks that the witnesses may like to add in response to questions from members of the panel or in response to the comments made by others of the witnesses.

Why don't I ask the first panel to come up, and then while I'm doing that, ask Senator Hecht if he has any opening statement that he might like to make.

Senator HECHT. No. Thank you very much, Mr. Chairman. I just want to commend you for holding these hearings. It looks like you have got an aggressive agenda, so I am anxious to hear from the witnesses.

Senator WIRTH. Our first witnesses this morning: Ms. Lois Irwin from Mercer Island, Washington; Dr. Stephen M. Jones from Seattle, Washington; Ms. Joanne Roberts from Seattle, Washington; and Mr. Wilbur Mills from Seattle, Washington. We welcome all of you and ask you to again observe the rules that I have laid out to limit your statements, if you might, to no more than five minutes. We will include them in full in the record. And perhaps we might just start from right to left, if you could all identify yourselves for the purposes of the record, and then proceed. If you might start please, Ms. Irwin.

Ms. ROBERTS. Jo Roberts.

Senator WIRTH. You're Joanne Roberts.

Mr. MILLS. And Wilbur Mills.

Ms. IRWIN. Lois Irwin.

Senator WIRTH. Excuse me?

Ms. IRWIN. Lois Irwin.

Dr. JONES. And Stephen Jones.

Senator WIRTH. Fine. Then Ms. Roberts, why don't we start with you? You have to pull the microphone right up close, if you would, as it will be difficult for us to hear otherwise.

Ms. ROBERTS. I have testimony here from——

Senator WIRTH. You could sit. If you could do that, and we will ask somebody to pick up those pictures so that everybody can hear and it will be part of the record, if we could do that please.

Senator FORD. You remind me of my mother. She wanted to do everything herself. Around here you ought to just let them help you. We will send somebody down to give you some help.

STATEMENT OF JOANNE ROBERTS, THE MOUNTAINEERS

Ms. Roberts. I represent The Mountaineers. The Mountaineers is the largest outdoor recreation club in the Northwest with over 11,000 members. Founded 1906, we have been leading trips for many years into what is now called the Arctic National Wildlife Refuge. We were there last summer and we will be there next summer. And here are pictures of our trip last summer.

The area is becoming more popular as our numbers increase and the wilderness experience we seek becomes less available close to home because of logging and development and increased use around our area.

When my grandchild Emily takes my great grandchild to hike in ANWR in the year 2040, they will be one of 32,000 mountaineers. And they and the rest of the folks on our crowded planet are likely to need wilderness a lot more than we need oil now.

Birds and animals have become the perpetual refugees of the modern world. Luckily they have a very large support group, 109 million of us Americans who actively participate in non-consumptive wildlife enjoyment, and we are drawn to the arctic coastal plain because there is nowhere else in the universe that we know of that can provide us with a similar experience.

Scientists call it our last whole arctic ecosystem: upland forest, coastal plain and marine environment. To us, the viewer, that translates not just to Dall sheep and polar bears, but to Dall sheep looking down on polar bears with caribou in between and the expectation of a wolf or a grizzly bear or an arctic fox appearing on the scene. The flocks of snow geese are the same that winter in our Skagit River flats. We feel connected to this wilderness.

Wilderness is a gestalt. It is more than the sum of its parts. It cannot be a little bit developed. It cannot be improved. It is as good as it is going to get.

Mountaineers historically are problem solvers. And we find it unjustifiable to develop ANWR at this time when we as a country have hardly begun to set in place all the methods of conservation and research on alternative sources that will make us truly independent. Indeed, we have regressed by lowering standards of efficiency and increasing speed limits. Focusing political energy on such diversionary projects as ANWR is postponing, as we speak, crucial national efforts to develop workable solutions to our energy problems.

Therefore, The Mountaineers urge the U.S. Congress to give as a legacy to our grandchildren not destruction of the last arctic wilderness but an adequate national energy policy which will give the United States of America the direction we so greatly need and preserve irreplaceable natural resources such as ANWR.

Thank you.

[The prepared statement of Ms. Roberts follows:]

The Mountaineers
300 Third Avenue West • Seattle, Washington 98119 • (206) 284-6310
BRANCHES IN TACOMA, EVERETT, OLYMPIA AND BELLINGHAM

STATEMENT OF THE MOUNTAINEERS ON THE ARCTIC NATIONAL WILDLIFE REFUGE

The Mountaineers is the largest outdoor and conservation organization in the Northwest, with more than 11,000 members. Our club has long had close ties with the State of Alaska, and the club frequently sponsors outings to Alaska, including the area now designated as the Arctic National Wildlife Refuge. We are currently planning to sponsor another trip to this area next year. In addition, some of our members have organized backpack and kayak trips on their own. Moreover, a number of commercial expedition guides and outfitters from this area lead trips to the Refuge.

With the growth of leisure time and the importance of recreation in our daily lives, more of our members and more of the general public are visiting the Wildlife Refuge. As more and more areas in the State of Washington are opened up to logging, recreation homes, and other forms of development, the availability of a pristine Wilderness area becomes more and more important.

The Wildlife Refuge is a unique eco-system and is a world class Wilderness resource. Many of the Wilderness areas in the "lower 48" are primarily mountainous areas. The Wildlife Refuge is unique because it is the last complete Arctic eco-system in our country. It includes upland forest, coastal plain, and marine environment in one area. The area is a wildlife refuge because it is the home of a great variety of wildlife, including caribou, Dall sheep, polar bears, fox, wolves, grizzlies, musk oxen, geese, loons, arctic terns, and many shorebird species. We feel a particular tie to the bird life in the Refuge because great flocks of snow geese, arctic tern and shorebird species frequent the Skagit River flats and Bowerman Basin in Washington in their Spring and Fall migrations.

We believe that this unique and world important area should be protected by formal Wilderness designation. We support legislation in the Senate similar to the Udall Bill in the House which will provide Wilderness protection. We strongly oppose S.1217 which would open up the Wildlife Refuge for full scale leasing and development.

The Wildlife Refuge amounts to only ten percent of the 1100 mile coastline. The State of Alaska has opened its lands for leasing and development, and most the area north of the Brooks Range has already been leased. Although the State of Alaska favors development, it estimates that there is only a five percent chance that recoverable reserves would exceed a five day supply. It would be foolhardy in the extreme to destroy this world class eco-system on the remote possibility that recoverable reserves would be developed.

Equally important, the decision on the Wildlife Refuge cannot be made in a vacuum, but must be considered in the picture of the overall United States energy policy. Here in the Northwest the Regional Power Planning Council, of which Senator Evans was a distinguished member for many years, has done long range energy planning which has been very beneficial for the entire region. This country needs a national energy policy much more than it needs the doubtful prospect of a limited supply of oil from the Wildlife Refuge. In fact, the amount of oil which could be produced, using the Interior Department's optimistic standards, is minor compared to the oil that could be saved by an aggressive national energy policy. It makes no sense to destroy this national treasure when increasing the average mileage of motor vehicles and insulating existing buildings would result in fuel savings equal to many times the estimated reserves of the Refuge.

Congress should keep in mind that there are existing oil reserves which are already developed in the South and Southwest of this country. The economies of Louisiana, Texas, Oklahoma, and other oil-producing states are near collapse. The long term solution to this country's energy requirements is to proceed with enhanced recovery methods from existing oil fields in the South and Southwest. The Department of Energy has estimated that over three hundred billion barrels of oil are not producible under today's technology but could be produced with enhanced recovery methods. Using the figures of the Department of Energy, which is certainly favorably disposed towards industry, enhanced recovery methods would yield about one hundred times the potential reserves in the Refuge, if there was any recovery at all. Compromising the wildest and most ecologically unique Wilderness area in the Wilderness System for the sake of this doubtful and shortlived benefit would be foolhardy and create a dangerous precedent for other Wilderness areas.

Some members of Congress have proposed limited exploration as a possible compromise. Any exploration would involve well pads, roads, discharge ponds, borrow pits, and other features which would permanently disfigure the landscape. These scars on the landscape would make the area ineligible for Wilderness designation in the future.

It is noteworthy that Canada, which relies heavily on oil and gas development as a major part of its economy, has rejected development in the Northern Yukon National Park directly east of the Refuge and has recommended that the United States refrain from development.

This Congress has a historic opportunity to protect this priceless eco-system for our children and grandchildren. The Congress should enact and implement a national energy policy and plan and preserve the Wildlife Refuge forever with Wilderness designation.

The Mountaineers

Ms. ROBERTS. I have some testimony here from the Washington Wilderness Coalition and the Federation of Western Outdoor Clubs.[1]

Senator WIRTH. And those will be included in the record without objection.

Thank you very much, Ms. Roberts. And thank you also for the startling precedent of finishing ahead of time. We greatly appreciate that.

Mr. Mills.

STATEMENT OF WILBUR MILLS, SEATTLE, WA

Mr. MILLS. Yes. I am Wilbur Mills, and I am here representing myself.

For the past 19 years, I have spent from 3 to 12 months each year in the Brooks Range of Alaska where I am a wilderness guide and a photographer. Much of that time has been spent in the Arctic Wildlife Refuge—in all, some 14 months in the field on more than 20 separate trips.

I first saw the coastal plain of the refuge in 1968 at Camden Bay where I came in early June to watch the arrival of the porcupine caribou herd on the calving grounds. Band after band of females and new calves, numbering anywhere from a dozen to over 100 animals, passed close to my camp. I saw from 2,000 to 3,000 caribou a day over a period of a week before the migration slowly tapered off. It was an unforgettable sight to climb a ridge and look across the miles of rolling tundra dotted with innumerable bands of caribou, the high snowy peaks of the Brooks Range in the distance.

I was on the coastal plain for nearly a month and had only two camps. Yet, it was such an abundance of life, such intense activity in the continuous daylight that there was hardly time to sleep.

Three pairs of snowy owls were nesting nearby. I saw an occasional grizzly bear and a wolverine. Red and arctic foxes passed by every day. And there was an amazing variety and density of bird life.

That was an incredible summer, and it had a major impact on my life. I left a six year career in engineering to try my hand at free lance photography and guiding.

On a later trip to the refuge, I was fortunate to witness firsthand the post-calving aggregation. I watched over 30,000 caribou form a tight mass on the far side of an arctic river, and then cross in a long flowing line. It was nearly two hours before the last animals arrived on the other side. They spread out over the tundra as far as I could see, massed again and then slowly moved out of sight. This is wildlife spectacle that is unrivaled in North America. Only in Africa can you see anything akin to it.

In my years in the Brooks Range, I have come to know and love many special places. But the sight of that first visit to the arctic in 1968 remains on top. There is no place like the north slope country of the Arctic Refuge. You can easily get hooked on it and return again year after year. Nowhere else do we have such an ecological and geologic diversity in such a compact unit. Nowhere else is there a continuum of beautiful wild country extending from the sea across the coastal plain to the mountains of the Brooks Range and beyond to the boreal forests of interior Alaska.

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[1] See Appendix II.

When we look at the entire arctic slope, 90 percent of which is open to oil development, is it not evident that a compromise has already been struck? When the Alaska Lands Act passed in 1980, so much of the north slope lands which were originally included in some of the bills were eliminated in the bill that finally passed. The gates of the arctic park especially suffered, and we now have a park severely lacking in north slope lowlands. Most of the eliminated lands went for oil development.

I grew up in New Jersey, one of the most densely developed areas of the country. And I remember reading Jack London and dreaming about the magic of the far north: the Arctic Refuge is a place where dreams can come true. Canoeing down a wild river, climbing an unnamed peak or exploring a valley where no one has been before, seeing the spectacular movement of caribou or howling with a group of wolves under the glow of the midnight sun. I have been lucky enough to experience all of these things. Today the refuge is still wilderness and the experiences are still available.

My hope is that this committee and the United States Senate will decide to keep this great wilderness wild and free and to keep it unobstructed by oil rigs.

[The prepared statement of Mr. Mills follows:]

Wilbur Mills
3020 Northwest 60th Street
Seattle, Washington 98107

STATEMENT OF
WILBUR MILLS
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
CONCERNING THE ARCTIC NATIONAL WILDLIFE REFUGE
OCTOBER 22, 1987

Mr. Chairman, members of the Committee:

I am Wilbur Mills, a nature photographer and wilderness guide specializing in Alaska. I am speaking to you today in my own behalf.

I first saw the north slope of the Arctic National Wildlife Refuge - it was then labeled a wildlife range - in 1968. The pilot guided the ski plane low over the tundra, but by June 4th the spotty snow cover was too thin for a landing. We set down on the sea ice about a quarter mile off shore. I quickly unloaded my gear and watched the small Cessna take off and disappear into the distant white peaks of the Brooks Range.

I set up camp adjacent to the beach at Camden Bay - the frozen sea stretching to the horizon in the north and the undulating tundra, a checkerboard of white and brown reaching southward, abruptly terminated by the escarpment of the Sadlerochit Mountains and the main range beyond. This was my home for the next four weeks; I did not see another human being during that time. I was, however, treated to the most exciting display of life I have ever witnessed.

It was calving time on the North Slope. Band after band of female caribou with their newborn fawns filed past my camp under the ever present Arctic sun. Between two and three thousand animals a day passed within sight range in bands numbering from a dozen to over a hundred. Each day the percentage of females with calves increased until most every cow had one. The procession lasted for over a week then gradually tapered off.

Caribou were not my only neighbors. It turned out to be a peak lemming year; you could not walk more than a few yards without one of the small, furry creatures scurrying beneath your feet. On several occasions I awoke during the bright Arctic night to find I had one or two of them as bedfellows. The abundant lemmings attracted a host of predators. Three pairs of snowy owls nested within a mile of my camp. I saw red and arctic foxes every day. There were golden eagles and an occasional grizzly bear. Bird life was prolific even though temperatures were mainly in the 30's and 40's and the wind blew almost constantly. Lapland longspurs, snow buntings, ptarmigan, many species of shore birds, loons, gulls, terns, jaegers and swans - calling, hunting, courting in a frenetic display of activity which never ceased.

Later that summer I saw dall sheep, a wolverine, moose and several more grizzlies. Caribou were always present. Two friends had joined me and while we observed three young bulls feeding about a quarter mile away, they suddenly bolted. Behind them ran a smaller, silver-grey shape. As they came closer we could see it was a wolf. Through binoculars we watched the long, sinewy form - tail extended and ears flattened against its skull - speed over the tussocky ground after a meal. The wolf abandoned the chase after a few hundred yards and slowly wandered off. The caribou resumed their feeding. We were ecstatic at having seen our first wolf and witnessed the ways of the wilderness in action.

What a storybook Arctic summer that was. I saw first hand everything I had read about as a child in books by Jack London, Robert Service and other chroniclers who wrote of the North as it was long ago. Here, in the wildlife range, I had found it intact - an island of wild, unspoiled, undiscovered magic in a modern, mechanized world.

That Arctic summer had a major impact on the direction of my life. I put aside my six year career in engineering to try my hand at nature photography and wilderness guiding. In the nearly twenty years which followed I have made many more trips to the Arctic Refuge: another entire summer in 1972 photographing and filming on the North Slope; kayaking and canoeing the Kongakut, Hulahula, Canning, Ivishak, Ribdon, Sheenjek and Junjik Rivers; hiking in almost every major drainage of the Refuge, accumulating some fourteen months of field time during those years.

In 1974 I was fortunate enough to observe, first hand, the post calving migration of the Porcupine Caribou Herd. I watched in awe as over 30,000 caribou massed on the west shore of the Kongakut River, then crossed the many-channeled stream in a long, flowing ribbon. A strand of animals spanned the flood plain for two hours before the last animals were across. They moved all around my vantage point - some passing just a few yards away - and spread out over the green tundra as far as I could see. They massed again and soon were out of sight beyond the summit of a low ridge to the east. The land seemed silent and empty again, but the sights and sounds of that moving sea of life is forever imprinted on my mind.

As a guide and outfitter, many of my trips to the Refuge were shared with others. A particularly memorable one was on the Jago River with six people from New York. The youngest member of the group was sixteen, the oldest, seventy-five. It was their first time in Alaska. The second day out we stood around after a late dinner giving our collective version of a wolf howl. From a distant ridge came a reply and soon we had called in a lone wolf to within two hundred yards. He stood and watched us for a while across the span of river gravel. We howled and the wolf responded - a wild call in a splendid mountain valley turned golden under the low midnight sun.

A few days later we saw what was likely the same wolf hunting caribou. On one of our hikes we startled a grizzly bear which rose upright out of a patch of willows fifty yards away. We stared at each other a few excited moments before the bear dropped to all fours and sped off.

By the end of this type of trip you become very close to your companions... living in the wilderness together and sharing experiences which are so, so rare in today's world. I still correspond with two people from that group.

I have taken many people into the Arctic National Wildlife Refuge, and on almost all of them it has had a significant impact. It is rare to find someone who is not impressed with this place. For many it touches a special chord within and provides a truly unique and deeply moving life experience. It is easy to get hooked and return again and again.

Growing up in metropolitan New Jersey, I remember vividly the complex of oil refineries, storage tanks, buildings and pipelines which lines the New Jersey Turnpike near Bayonne: the smoke, the smell, the oil stained earth, the dirty waters. Even a kid from the streets of Hoboken got the feeling this was not a place which supported healthy life, human or animal. When I first saw Prudhoe Bay I thought of Bayonne. Here was a major industrial complex; a high impact development on a mind-boggling scale.

It is equally mind-boggling to envision this kind of development on the coastal plain of the Arctic Refuge. There is no way oil development, or even exploratory drilling could take place there without distroying its essential values. The wilderness integrity of the Refuge would be gone, and with it the pristine ecological continuum which extends from the Arctic Sea, across the Brooks Range to the interior forests. The sweeping views across the plains from the frontal peaks of the Brooks Range would be broken by roads, buildings, airfields and drilling towers. The Porcupine Caribou Herd as we know it, number over 150,000, would become a mere remnant of what it now is. Gone would be the opportunity to witness the wildlife spectacles which I have seen. We would sacrifice this for what, in even the most optimistic estimates, would satisfy our oil needs for only a few months.

Cannot we afford to keep just one small portion of the North Slope free from development? Over ninety percent of Alaska's coastal plain is already open to oil development. When the offshore areas are included, the figure is even more lopsided. When we look at the entire Arctic slope, is it not evident that a compromise has already been struck? The compromise is preservation of a complete Arctic National Wildlife Refuge.

To lease the coastal plain of ANWR for oil development as proposed by the Department of the Interior would be tragic. It would rob future generations of a complete Arctic National Wildlife Refuge. It would degrade beyond measure the premiere unit of the national wildlife system. It makes a mockery of the efforts by so many people over so long a time to preserve a wildlife and wilderness legacy of global significance.

I urge this Committee to keep the coastal plain wild and unspoiled, to give it full, lasting protection under our wilderness system, so that those who come after us will have the opportunity to experience true wilderness.

Senator **Wirth**. Mr. Mills, thank you very much for your good testimony.

Ms. Irwin.

STATEMENT OF LOIS IRWIN, MERCER ISLAND, WA

Ms. **Irwin**. Mr. Chairman, members of the committee, I am Lois Irwin from Mercer Island, Washington.

Before I start, I have a letter from a lady who is now 90 years old. She was at the refuge when she was 78, and she would like to have her letter included in the record.[1]

Senator **Wirth**. Without objection, that will be included in the record.

Ms. **Irwin**. I also have a few pictures that were taken in the area that we are talking about today. And if you would like to see them while I am talking.

Senator **Wirth**. We will have somebody come pick them up and pass them through the committee. Thank you.

Ms. **Irwin**. I am here representing myself and my husband Ward Irwin. We have been to the Arctic National Wildlife Refuge five times. Having spent a total of six months ranging from the southern boundaries to the northern coast, over 450 miles by kayak including 80 miles along the arctic coastline, plus several hundred more miles on foot, I feel that I can appreciate ANWR in its entirety and what it means as a total ecological unit.

I first went to the Arctic National Wildlife Refuge in 1969 to the Lake Schrader and Lake Peters area. The flight over the mountains in the small float plane was spectacular. The peaks and colors ranging from rust, purple, red, green, black, gray and white were like a shifting aurora. As I stepped ashore at the lake, my first impression was of the multitude of young birds flitting about not yet able to fly so that care must be taken not to step on them. It was my introduction to the arctic.

The 1002 area would appear to be only a small fraction of the refuge. But it is on the coastal plain that the wildlife is truly abundant. The plain is a relatively narrow, tapered strip and from the mountains one can easily see the ice along the ocean. The microwave dishes at Barter Island are visible from the last hills above the Hula Hula. And from a hill overlooking the Canning River, we saw the towers and smoke at Prudhoe Bay.

Traversing the rivers across the plain and along the coast by kayak, with side trips on foot, gave the opportunity to observe the animals, birds and flowers at close range. Several times we have been very close to wolves. There was one chasing a caribou going up river on aufeis, another quietly surveying our camp while on an early morning jaunt, one coming to the riverbank to watch as we floated by and still another sitting on the opposite side of the stream responding to our calls as we did our best to imitate a wolf howl.

From one vantage point we observed through binoculars the comings and goings of a wolf pack as individuals went out to bring back food to their young. Once during a snowstorm from our tent, we watched a wolf at a caribou kill on a river bar devour his fill, to be followed later by a grizzly getting his meal, and finally a golden eagle picking the last bits of flesh from the bones.

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[1] See Appendix II.

One time we surprised a grizzly sow as she lay napping on the riverbank with her three cubs. Another time as we were sitting on a small hill above some aufeis, a grizzly came around a bend, rolled on his back on the crumbling ice, shook himself, then passed so close below us that we could hear the crunch of his footsteps as he shuffled along at a steady, ambling gait.

We have been fortunate to see the caribou migration, masses of animals filling valley after valley, flowing over the ridges like an undulating wave. One morning, camped west of the Aichilik, not far from where swans were nesting, we were awakened by a soft grunting sound. There were caribou as far as we could see in either direction, some only 100 feet away. Most were milling back and forth as they fed. Some congregated in dense groups and others were resting out on the ice.

Farther along the shallow waters of the coast, we sledged on the ice pack and passed by an abandoned DEW-line station, a dismal looking place with rusty bells, equipment, Caterpillar treads and machines pushed over the bank and rusting in the water. On-shore a crane and some vehicles also rusting, plus a number of shed-like buildings, big fuel tanks, et cetera, all abandoned as junk when the station was obsolete.

Kayaking along the coast, the stillness and quiet were remarkable. One could hear the calls of birds and the whirring of their wings as they flew by. There were no sounds of human activity, no engine noise.

ANWR is a place unlike any other. For thousands of years it has been there. We are opposed to any exploration and urge that wilderness protection be given to the ANWR coastal plain.

Thank you.

[The prepared statement of Ms. Irwin follows:]

STATEMENT OF
LOIS IRWIN
BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
CONCERNING THE
ARCTIC NATIONAL WILDLIFE REFUGE
WASHINGTON D.C., OCTOBER 22, 1987

I am Lois Irwin from Mercer Island in Washington state and I am representing myself and my husband, Ward Irwin.

I first went to the Arctic National Wildlife Refuge in 1969 to the Lake Schroeder and Lake Peters area. The flight over the mountains in the small float plane was spectacular; the peaks in colors ranging from rusty, purple, red, green, black, gray and white were like a shifting aurora. As I stepped ashore at the lake, my first impression was of the multitude of young birds flitting about, not yet able to fly, so that care must be taken not to step on them. It was my introduction to 9 trips to the Brooks Range of northern Alaska, 5 of them in the Arctic National Wildlife Refuge.

The second trip was for a month on the south side of the Brooks Range with 10 days spent backpacking from Last Lake to the Continental Divide and return and the rest of the time paddling down the Sheenjek and Porcupine Rivers to Fort Yukon.

The third and fourth trips were of 6 weeks duration each, to the Kongakut and Hula Hula Rivers on the North Slope. Again we first backpacked high into the mountains before starting downriver by kayak, and we always took time to explore the surrounding area from each campsite. On these two trips we continued in our kayaks along the Arctic seacoast back to Barter Island, thereby having the opportunity to explore the reefs and lagoons of the Beaufort Sea and the outlets of the Aichilik, Jago and Okpilak Rivers.

The fifth trip of six weeks began with a 3-week trek across the Brooks Range from the south side, over Carter Pass to the Marsh Fork of the Canning River where we connected with our boats and then followed the same pattern of kayaking a day, setting up camp and exploring for a few days, and ended with a westward paddle past the Staines River mouth to Flaxman Island.

The rivers were interesting – not too difficult, but definitely not lazy – the water was crystal clear except after a rain when it became laden with silt. There were occasional channels through ***aufeis*** (overflow ice), and often a maze of braided channels to test one's route-finding ability. At times we might be divebombed by Arctic terns which winter on the tip of South America, or mew gulls, as we floated past their nests built on midstream islands.

At the deltas where the rivers form huge fans the water is so shallow that the kayaks become grounded and one must walk in the water for long distances pulling the boat along behind. From the Kongakut it was 55 miles along the Arctic coast back to Kaktovik and from the Hula Hula River 15 miles. From the Canning we paddled 15 miles to Flaxman Island where we were later picked up to fly to Prudhoe Bay.

Having spent a total of 6 months in the Refuge ranging from the southern boundaries to the northern coast, nearly 550 miles by kayak and several hundred miles on foot, I feel that I can appreciate the ANWR in its entirety and what it means as a total ecological unit. The 1002 area would appear to be only a small fraction of it, but it was on the coastal plain that the wildlife was truly abundant. The plain is a relatively narrow, tapered strip and from the mountains one can easily see the ice along the ocean. The microwave dishes at Barter Island are visible from the last hills above the Hula Hula, and from a hill overlooking the Canning we saw the towers and smoke at Prudhoe Bay.

Traversing the rivers across the plain and along the coast by kayak with side trips on foot gave the opportunity to observe the animals, birds and flowers at close range. Several times we have been very close to wolves. There was one chasing a caribou going upriver on ***aufeis***, another quietly surveying our camp while on an early morning jaunt, one coming to the river bank to watch as we floated by, and another sitting on the opposite side of the stream responding to our calls as we did our best to imitate a wolf howl. From one vantage point we observed through binoculars the comings and goings of a wolf pack as individuals went out to bring back food to their young.

Once during a snowstorm from our tent we watched a wolf at a caribou kill on a river bar devour his fill, to be followed later by a grizzly getting his meal, and finally a golden eagle picking the last bits of flesh from the bones.

One time we surprised a grizzly sow as she lay napping on the river bar with her three cubs. Another time, as we were sitting on a small hill above some ***aufeis*** a grizzly came around a bend, rolled on his back on the crumbling ice, shook himself off, then passed so close below us that we could hear the crunch of his footsteps as he shuffled along at a steady ambling gait. Still another time a grizzly crossed the river to investigate our movements, but dashed off when he got our scent.

We saw Dall sheep in the mountains but not out on the plain. Occasionally moose were encountered. On one 15-mile hike from the Hula Hula we tried to get close to a muskox herd but only succeeded in approaching within a half mile. At one point the leader stood off to one side facing the small herd. Some signal appeared to have been given for they all started running toward him and bunched together. Then a helicopter flew over – whether or not it was the noise of the engine that caused them to behave in such a manner is a question.

Everywhere there were birds – horned larks, longspurs, gulls, phalaropes, pintails, old squaws, all 4 members of the loon family, jaegers, red-breasted mergansers, snow buntings, wheatears, sandpipers, plovers, harlequins, scoters, geese, swans, owls, falcons and many others. Three species of eider often nest on the reefs. It has been a source of excitement and wonder to see the tundra swans, snowy owls, brants, snowgeese and even an occasional gyrfalcon wintering in Washington only a couple hours drive from Seattle. On the Washington coast one glimpses white-fronted geese, terns and loons on their way farther south, while millions of shorebirds spend the winter in such places as Bowerman Basin and others stop there to feed and rest to gain sufficient energy to continue to their winter homes.

Besides seeing many small bands of caribou, we also have been close to the big migration in the 1002 area and along its eastern edge. From my journal here are some quotes on the caribou:

> July 13, Lower Kongakut
> Saw several tremendous bands of caribou travelling east – the migration is under way! One herd filled a whole valley, the forward group was visible at one depression, then a long ridge cut some from sight; at the next valley depression they were still streaming through like an undulating wave – still more right beside the river. Herds have mixed bulls, cows and calves – one very black bull, many shades of brown and tan – some grazing on a green bar below the bank – more coming over the hill, and yet more coming in the distance – a few in groups of 2 to 4 on river bars – 3 yearlings close by showed their curiosity toward us. I don't know how many thousands were

seen today

July 18, Beaufort Lagoon, west of Aichilik River
Awake early – 7 swans on a small pond a few yards from our tent, 2 others farther away. Later vaguely aware of a soft grunting sound, we left our tent, exclaiming over caribou as far as we could see in either direction and very close to camp. Spent next two hours viewing and photographing. Caribou were moving west, then some turned back and congregated in a dense pack on point just east, others went out on the ice to rest. Later those that had continued west seemed to be returning to rejoin the herd. Probably 100 feet was the closest any came to us, although some motion in camp may have prevented their coming closer. Breakfast included char, grilled to perfection, then off in our kayaks at 1:30. Had to do some sledging on the ice pack around Nuvagapak Point before reaching Beaufort DEW-line station – a dismal looking place from the water with rusty barrels, equipment, caterpillar treads, and machines pushed over the bank and rusting in the water. On shore a crane and some vehicles also rusting, plus a number of shed like buildings, big fuel tanks, etc – all abandoned as junk when the station became obsolete. Why can't the trash be barged out when the people go home as part of the cost of doing business here?

Kayaking along the coast brought new adventures as we encountered solid ice pack, shallows, or a series of canals in the sea ice. Often this meant pulling the boats like sleds over the ice, wading through shallow water or finding leads through openings in the floating ice to paddle through. Along the shore were occasional remains of old dwellings built of driftwood and insulated with sod, usually with a skylight window in the roof. Nearly everywhere ashore were flowers – sometimes whole carpets of them. Arctic fox were denning in the banks and gave no heed as we watched them. Sometimes a fog came up to cast a beautiful light on mirror-like water. There were spectacular sunsets lasting for long periods of time, the sun never dipping below the horizon. The stillness and quiet were remarkable – one could hear the calls of birds and the whirring of their wings as they flew by. There were no sounds of human activity – no engine noise

At one point we met an Eskimo and his two granddaughters from Kaktovik who had been camping there in a tent for a month. Near their campsite was a driftwood log house in which he lived during the winter when he trapped fox. Now he was set for fishing, but a heavy storm two years before had changed the nature of the spit so that there were fewer fish. He invited us in for coffee which the girls served [illegible] burning stove made the tent cozily warm. Flat boards from the beach made a floor. Outdoors caribou was drying on racks – the girls had recently killed one with a rifle. There was also an ice cellar for freezing meat and fish. (As a food, caribou meat surpasses all others, either wild or domestic, in nutritional value. Villagers in or near the ANWR in both Alaska and Canada are heavily dependent on caribou as a major part of their diet.)

The old man told us that in the early 1900's people were living all up and down the beach in those places which we now saw abandoned. Shifts in the wind cause the ice pack to move; he was waiting for the wind to come from the east so that he could take his motor boat to Barter Island. He said that when the eider ducks started flying west again this was an indication that the wind would change. We noticed soon after we left a flock of eider heading west and later the wind did change.

Here is a quote from my Canning trip journal:

> On the flight from Flaxman Island to Prudhoe Bay, the landscape was flat and wet, with many lakes and braided streams. We passed over oil wells, saw damaging effects of tractor roads where tracks had widened, deepened and were full of water with sides sloughing in. The Prudhoe Bay complex is huge and very spread out. Built up raised gravel roads and pads have required tons and tons of gravel. Besides oil installations there are many other long buildings built high on stilts and fitted together with corridors in domino fashion. . .Ships offshore with more building materials. Population of area 3500 (1978) but eventually will be decreased to 1000.

We know that the Prudhoe oil wells will be pumped dry in a few more years. No one believes that when that time comes, steps will be taken to return the area to its former natural state. The abandoned DEW-line site we saw east of Kaktovik will be insignificant in comparison.

In the meantime we continue to squander our oil resources. Alternative energy sources have been de-emphasized, auto speed limits are increased, gas is cheap, and millions of people each require separate vehicles to drive to work or to shop for groceries and other goods. We have not dedicated ourselves to fuel conservation, even though it would quickly make more oil available for strategic purposes than could ever come out of the 1002 area. It seems shortsighted to open the ANWR coastal plain for exploration and development, and only preserve 25 miles for wilderness, when all the rest is the plain west of the Staines River is open to oil search. We need an over-all national energy policy and plan before deciding if this drastic move is really necessary at this time.

Industrialization here would involve severe disruptions of the habitat and breeding grounds for mammals, birds and fish, with impacts not only in the immediate area, but also in our own state of Washington and in other regions throughout the world. Hundreds of people in recent years have discovered the unique recreational opporunities in the ANWR. Not just a few "macho" types, but very young people and senior citizens visit the refuge. Of those I have met the youngest was 13 and the oldest was 78, but there have been many in between. Personally, on my 9th trip to the Brooks Range in 1984 I was 65, and I'm not through yet. Geographically, we have met people in the Refuge from all over the U.S. and from Europe. Some were scientists, some recreationists, some interested in the animals and birds, some in the flowers and other vegetation, all of them enjoying the thrills of watching wildlife activites in virgin wilderness. They all shared our common interest – the preservtion of the entire ANWR as it is now.

I am opposed to the Murkowski bill and to any compromising bills. Any oil exploration and development would destroy the wildlife habitat, the recreational opportunities and the wilderness forever. The coastal plain is an integral part of the Arctic National Wildlife Refuge and deserves wilderness status. I strongly urge that wilderness designation be given immediately to the entire coastal area.

Senator **Wirth**. Ms. Irwin, thank you very much.

Ms. **Irwin**. Sorry, sorry.

Senator **Wirth**. Mr. Jones.

STATEMENT OF DR. STEPHEN M. JONES, SEATTLE, WA

Dr. **Jones**. I am representing myself and six business associates who are in private veterinary practice in Seattle, Washington.

I also have four letters here from four other users of the Arctic Wildlife Refuge I would like to have entered.[1]

Senator **Wirth**. Those will be included in the record.

Dr. **Jones**. My interest in Alaska and wilderness has taken me to Alaska six times, four times to the Brooks Range, three of those to the Arctic National Wildlife Refuge. I have spent a total of 80 days within the refuge.

These trips to the refuge are unique wilderness experiences because the area is extremely isolated, the scenery is spectacular, and all of it is alpine and sub-alpine terrain. Wildlife encounters are very special events. I would like to share a few of mine.

We were camped for two days on a major caribou migratory route. It wasn't unusual to have hundreds of caribou pass within feet of our camp. While hiking one day, we accidentally came within 100 feet of a grizzly sow and a two-year-old cub. With only a shallow stream to separate us, the few minutes that she spent standing on her hind legs and growling and snapping her jaws seemed like forever.

We were watching a herd of Dall sheep not 400 feet away from us when a ram wandered within 20 feet.

One evening we took a hike to a summit of a mountain that gave us an unobstructed view of the midnight sun over the Arctic Ocean and the coastal plain. Caribou herds were migrating through the passes below us. Between the fog drifting off the Arctic Ocean and the low lighting from the midnight sun, the scene took on a mystical quality. While we sat, a wolverine appeared on the summit slope and remained in view for several minutes. At the edge of the coastal plain, we were able to get within 100 feet of a lone musk ox bull.

What is special about the refuge goes far beyond the wildlife there. There are no places that are as remote and where man's intrusions are not in evidence. It is important to have a place like the refuge where we can get away from those things that prevent us from feeling that we are a part of the space in which we live and allows us to feel a part of the land community again.

To jeopardize a renewable wildlife land resource in the process of extracting oil, which is a non-renewable resource, does not make much economic sense when the greatest estimate of that oil resource would supply us with less than one year's energy needs. It is far more important to develop a comprehensive energy policy with conservation as its centerpiece.

The survivability of an ecological system is analogous to the survival of the human body. It requires all of its part. The loss of some of the parts compromises the body's function. The loss of others, such as the heart, causes death. The loss of the coastal plain to oil development is the loss of the heart of the refuge.

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[1] See Appendix II.

[The prepared statement of Dr. Jones follows:]

STATEMENT OF
DR. STEPHEN M. JONES
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
CONCERNING THE ARCTIC NATIONAL WILDLIFE REFUGE
OCTOBER 22, 1987

Mr. Chairman, members of the Committee:

I am Dr. Stephen M. Jones, representing myself and 6 other business associates who are in private veterinary medical practice in Seattle, Washington.

I received a Doctor of Veterinary Medicine degree in 1966 from Oklahoma State University and spent 2 years as an epidemioligist with the United States Public Health Service's Centers for Disease Control in Atlanta, Georgia. From 1968 to the present I have been in private practice in Seattle, Washington, with 16 of these years as a practice owner. I took my first trip to Alaska in 1976 when I visited most of the major population centers and had short stays in Glacier Bay and Denali Park. My interest in wilderness and Alaska has taken me back for five more trips, one in a sea kayaking trip to Glacier Bay via the Queen Charlotte Islands off the British Columbia Coast and four other trips to the Brooks Range. Three of these trips were to the Arctic National Wildlife Refuge and lasted 15, 39, and 26 days, the last one was in June of this year. All of these trips included a backpacking and a river float segment, ranged from the eastern to the western boundaries and included the North and South Slopes.

Having spent this much time within the refuge I have had the opportunity to see wolves, caribou, Dall sheep, grizzly bears, wolverine, red fox, moose, golden eagles and muskox. This last trip was the most intense wildlife experience that I have encountered. Two of our camps were on a major caribou migratory route for the bulls and barren cows who were on their way north to join the cows that were calving on the coastal plain. It was not unusual for herds in the hundreds to pass within feet of us as often as every 30 minutes. As long as we were upwind of them and didn't move, they would walk right by us. It was truly an amazing sight with this unrelenting mass movement of animals being pushed north by the migratory instinct. During one of our travel days on the 16-day hike, the two of us accidentally came within 100 feet of a grizzly sow and her 2-year old cub. The two of them appeared out of the willow bushes on the opposite side of a small ankle-deep stream that we were partially across. Both of us were startled by each others' presence and, being a sow with a cub to protect, we had ourselves in a very precarious position. The few minutes that she spent standing on her hind legs, growling, snapping her jaws and running into the stream toward us seemed an eternity before she decided to break contact. The stream was probably the reason she did not promptly attack us even though it wasn't a significant physical barrier. One of our exploratory days was spent sitting above what we later found was a salt lick and watched a herd of over 25 Dall rams, ewes and lambs not 400 feet away. While sitting there, we had a number of rams wander up the many trails that were well worn into the tundra with one of them coming to within 20 feet of us. One evening, four of us took a midnight hike to the summit of a mountain that gave us an unobstructed view of the midnight sun over the coastal plain and the Arctic Ocean. The caribou herds on the plain were starting to move into the mountains that evening, so we had literally a bird's-eye view of thousands of animals moving across the low passes below us. Between the fog drifting off the plain and the light from the low midnight sun the scene took on a mystical quality. While we sat quietly watching this spectacle unfold, a wolverine appeared on the sunlit slope 200 feet to our left and proceeded to amble along, digging here and there for food.

It was at least 5 minutes before he disappeared from view. The wolverine is the most shy of all the animals in the Arctic and to have had this encounter made the moment even more magical.

The most unexpected wildlife experience was discovering a lone muskox bull at our last camp on the river float. We were able to get within 100 feet without his getting upset. These animals are fascinating beasts that look like prehistoric buffalo with long wool skirts.

I have been on numerous wilderness trips in Alaska, Washington State and British Columbia and have never had as many wildlife encounters as in the Arctic Refuge. However, the wildlife are only part of the specialness of the Refuge. The intenseness of the isolation is unmatched anywhere. Having an area that will remain as it has always been without man's intrusions is unique. The unpoluted air and water are becoming rare indeed.

It becomes apparent even after a short time in such a place that everything there has a connection to everything else. It is impossible to separate the tundra and its plant community from the animals that live on and in it. During this year's trip, my companion and I wrote a poem.

"TUNDRA COUNTRY"

The tundra is many things to many creatures,
Because of its multiple ecological features.

To the caribou it is a mighty road,
Also a place to ingest a lichen load.

The Redpole thinks 'tis home-sweet-home,
until the Golden Eagle begins to roam.

The ground squirrel lives twixt 3 and 15 inches,
For from below the permafrost pinches.

The grizzly bear considers it to be a diner,
He/she eats willow roots and ground squirrels unless there is finer.

The mountain sheep consider the higher hills a playground;
At hide and seek they are seldom found.

A footsore hiker far from home,
Treasures the quiet, beauty and lack of a phone.

He/she can also observe firsthand the interconnectedness of
the animal kingdom,

In which the total of all the ecological niches clearly exceeds
their sum.

All in all, tundra country is an awe-inspiring place;

A place to worship life at its natural pace.

***

Nowhere is this dependence between the animals and the environment more acutely felt than that between the coastal plain and the rest of the Refuge. Much has been made of the fact that it represents only a small portion of the Refuge, 1.5 million acres out of a total of 19 million acres. What this does not take into account is that the coastal plain is the most biologically active part of the Refuge with any impact there having repercussions throughout not only the Arctic Wildlife Refuge but in that area of Canada to which a large portion of the caribou herd migrate.

The impact of oil drilling on the coastal plain is not limited to the caribou. Just as seriously impacted or more so would be the wolf, golden eagle, grizzly bear, snow geese and polar bear. One animal that gets only passing mention is the muskox. These animals spend their entire lives on the coastal plain and would suffer up to a 50% decline in population. This is an ironic development, for the muskox was hunted to extinction in Alaska in the early 1800's. A herd of 30 muskox from Greenland was brought to the University of Alaska at Fairbanks in 1930 for research purposes. The research money ran out so they were barged down the Yukon River and left to fend for themselves on Nunivak Island. By the 1960's, the herd had grown to 500 animals so in the late 60's they were reintroduced to the North Slope. It seems that the future of the muskox is again in question.

Just as important as the direct impact that oil drilling would have on the animal populations is the effect it would have on the air and water quality and what both of those would have on the plant community. The buffering ability of the plants which make up the base of the food chain on the coastal plain is very limited such that even minor damage to the plants could have devastating affects.

In proposing that there be no oil development on the coastal plain, we have been accused by Mr. Donald Hodel of misrepresentating the facts. Much of the data collected by the Department of Interior's own Fish and Wildlife Service was either ignored or mistated by the Department of Interior's recommendation that oil development go forward. It is far more important to develop a comprehensive energy policy with conservation as its centerpiece than to develop more oil sources. To jeopardize a renewable wildlife/land resource in the process of extracting oil which is a non-renewable resource does not make economic sense, especially when an optomistic estimate of that oil resource would supply the United States with less than one year's energy needs.

As we impact and in some cases destroy the land using the broad definition of land to include the air, water, soil and the food chain, so we impact and possibly destroy ourselves. If we see ourselves as apart from the land then proceeding with oil development does not have significant consequences, but if we feel this connectedness to the land then oil exploration has devastating consequences. My wilderness experiences have shown me that we are as tied to the land as we are to each other and to ignore that connection will lead to a decreasing quality of life and a loss of respect for ourselves. I would like to quote from Aldo Leopold, a respected American forester and author of A Sand County Almanac:

> "A land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. A land ethic cannot prevent the alteration, management and use of the "land resources" but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state."

The survivability of an ecological system is analogous to the survival of the human body. It requires all of its parts. The loss of some parts compromises the body's function; the loss of others, such as the heart, causes death. The loss of the coastal plain to oil development is the loss of the heart of the Refuge.

Senator **Wirth**. Thank you very much, Dr. Jones.

Let me ask—first I will ask my colleagues, those who have recently arrived, if they have opening statements that they might like to make or questions that they might like to ask. Senator McClure?

Senator **McClure**. I have no questions. Thank you.

Senator **Wirth**. Senator Ford.

Senator **Ford**. I have no statement.

Of course, I am sure I know the answer to this question. Is there any kind of a compromise between your position and the position of those who would like to open the whole area up to drilling? Has anybody given any thought to that?

I noticed in the House that they have come up with another bill—and the reason I ask it, I would like to have your input and I think it is important that you all have your input. But some in the House apparently have struck some kind of compromise that has basically, so they say, generally satisfied all parties. So, have you all been involved on the House side?

Ms. **Roberts**. Yes, certainly. We have been talking to all of our Representatives.

We made a compromise a long time ago on this. All we have left is 120 miles of coast out of 1100 up there. There is no way that you can compromise wilderness. As I said in my statement, it is as good as it is going to get. There is no way you can manage it to make it any better. We compromised already, and we must keep this.

We have no complete ecosystem in the lower 48. When we created Yellowstone Park, we didn't make it big enough. We are having to reintroduce wolves there. We don't know whether they will be able to survive because we have no control of the land they need outside of the park in order to survive. This is our last opportunity to keep a whole ecosystem in this country. If we ruin it now, it will be forever. No compromise.

Senator **Ford**. I think that is a very emphatic answer. [Laughter.]

Yes, we'll put you down as undecided. [Laughter.]

Ms. **Roberts**. At your peril.

Senator **Ford**. Dad told me two things never to do: get in an argument with a woman or run for school board. [Laughter.]

So, I'm not going to do that. I learned that a long time ago. Mother brought me up right.

Senator **Murkowski**. Is there any order in that?

Senator **Ford**. Sir?

Senator **Murkowski**. Is there any order in that advice, or does it make any difference?

Senator **Ford**. I gave it in the right order.

Yes, Doctor?

Dr. **Jones**. No, I think my sentiments are exactly the same. The same problem has occurred in Rainier National Park, which I am familiar with, in that a number of species of animals have become extinct because there wasn't a large enough system set aside to allow those animals to exist in all of their entire system in which they needed to survive. So, this is I think an excellent example of having a beautiful, high mountain park but without the necessary lowlands to support the wildlife that lived only part of the year there.

Senator FORD. Many who say that it will not disturb the area and that sort of thing cite the Alaskan pipeline. And we see pictures. I've never been there. I'm not as fortunate as you, Doctor, and others. So, I have to kind of take the word description or the word picture that is painted by those who testify. And they show us pictures of caribou grazing near the pipeline and it hasn't disturbed them. And they continue to move freely. They say that it would stay the same.

Dr. JONES. Well, I think there is a big difference, apparently, between bulls and barren cows and their willingness to participate in grazing and activity around development compared to cows who have calved. They are very leery and have a much different attitude about intrusions.

Senator FORD. Their instincts are different.

Dr. JONES. Very different, very much so.

Senator FORD. So, you would say that a mother caribou would have a different approach. They would not go by the pipeline.

Dr. JONES. At least from what I understand from the studies that have been done by those people who are experts in caribou, they have said that they react very differently to intrusions into the area in which they calve than what you see with the typical pictures of bulls and barren cows without calves and their contact with development.

Senator FORD. How do you answer then those who say that the calving areas are not always the same place every time? They vary from year to year. They don't always go back to the same area to calve. It could be 20 miles away or 50 miles away.

Dr. JONES. Well, the percentages are roughly 60 percent of the time the porcupine caribou herd calves in the coastal plain that is in question here and 40 percent of the time—these are the statistics that I'm aware of. Forty percent of the time they calve on the Canadian side of the coastal plain, and that the coastal plain is very narrow at this point. It's not very wide. It is only 25 miles wide or less. And there is a large congregation of animals that have to function within that narrow area. So, it's a much more critical calving ground than the calving ground in the Prudhoe Bay area further west, which is a much wider plain. And they have other alternative sites in which to calve.

Senator FORD. Am I correct that they come to the U.S. side to calve and then in the wintertime go back over to the Canadian side?

Dr. JONES. It's a combined herd that involves animals from both Canada and the U.S. They don't all migrate to the Canadian side. A large number of them do, but a number of them do stay on the U.S. side.

Senator FORD. Fine. I thank you all very much.

Senator WIRTH. Senator Murkowski.

STATEMENT OF HON. FRANK H. MURKOWSKI, A U.S. SENATOR FROM THE STATE OF ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman.

I would like to compliment the witnesses. I listened to the testimony with a reminiscence, if you will, of my own wilderness experiences in Alaska since childhood. And I certainly feel that they have portrayed vividly the extraordinary experiences that can be gained by viewing the magnificent nature of the State and certainly the coastal plain.

I find the responsibility, not only as a member of the Alaskan delegation, but a member of the Energy Committee, as we debate the merits of opening up the coastal plain, balanced with the reality associated with the current situation in the Persian Gulf where we have got some 30 to 35 naval vessels and probably 15,000 to 16,000 Americans that are prepared to sacrifice their lives if necessary to keep oil flowing in the Persian Gulf and the merits of whether or not we initiate exploration in this particular million and a half acres or whether we leave it in its natural state.

I think it is fair to say for the record that we do know factually whether there is substantial reserves that would warrant a development, and we will not know unless the area is leased. And the consequences of development have been outlined here by these qualified witnesses from the standpoint of how they would envision the occurrence of development.

Part of the contrast of reality causes one to reflect on the Canadians and what they have done. I believe one of the witnesses made reference to the northern Yukon National Park, the area east of the refuge, and what has happened there where the Canadians have recommended that the United States refrain from development. What is not known by many is the fact that the Canadians saw fit to drill approximately 80 wells in that area. They built the highway across a large part of western Canada which the caribou cross. It's called the Dempster Highway. That's the porcupine caribou herd. So, as we reflect on what Canada has done, I think it is important for the record to note that they initiated the park after they had drilled 80 wells in the area and determined that there was little likelihood of any major finds. That's neither here nor there. It's just an important point to keep in mind.

Another witness indicated that he has flown into the areas five times. And of course, to fly into an area, you have got to use fuel. And there is a reference that we continue to squander our resources. Well, this is the part of the problem. I think there were 300 to 400 visitors in the area. It's an extraordinary area. Most of the visitors were members of various committees that went up to see what it really looked like. But as we know, it's expensive.

It is remote, and it contains an extraordinary ecosystem. But as we reflect on the ecosystem, one has to keep it in parameters because the coastal plain, while a large area of approximately—well, the national wildlife area is about 18 to 19 million acres. It is important to keep in mind that there is designated in perpetuity out of that approximately 8 million acres that will remain a wilderness regardless of what may happen with regard to the million and a half acres that is proposed to be put up for lease.

The comparison of the arguments that are being used today and the arguments that were used in the late 1960s with reference to whether or not we should allow Prudhoe Bay to be open all have a bearing in comparison because that's all part of an arctic ecosystem. We have seen the experience of the caribou in Prudhoe Bay where in the early 1970s we had herds of 3,500 to 4,000 animals, and the reality that we currently have in the Prudhoe Bay central arctic herd is 14,000 to 15,000 animals. These are facts that have been substantiated by biologists. Obviously, there are reasons for that: predators, a lack of hunting.

But as we reflect on what we are going to do in the arctic, why, we have to keep in mind that there is a significant portion already set aside in perpetuity. Eight million acres is a large area. I might add it is as much as—certainly larger than the State of Maryland and almost as much as Maryland and New Jersey put together.

We have got another 8 million acres in the Arctic National Wildlife Refuge. There has been a set-aside in a refuge area.

It has been estimated that if the area of a million and a half acres is leased in its entirety and all the leases produce oil, which hardly ever happens, there will be about 1200 acres utilized simply because of the technology that is available and the ability to make a smaller print.

So, I think as we reflect on the merits of what we are trying to accomplish here in relationship to whether or not the area should be opened up, we should recognize that indeed in Alaska we have made some giant strides in the right direction that unfortunately other States did not have the opportunity to do. We have in Alaska approximately 57 million acres of wilderness that is permanently designated as wilderness. That is as much as the land mass of Connecticut, Hawaii, Maryland, Massachusetts, New Hampshire, and New Jersey. So, we haven't done everything in a manner that would imply that we have been hell bent on a magical development scenario. And that's appropriate and that's correct.

So, as we reflect on the uniqueness of the ecosystem, it is a given fact that it is a unique ecosystem. As we reflect on the coastal plain acreage, we have to keep in mind that there is a village there, 400 people, Kaktovik. So, it is not an untouched area. There have been caribou activities. There have been biologists. There have been DEW-line sites that have already been there. We have seen the migration of the caribou in an inconsistent manner this year with previous years as a consequence of their calving pattern. And the question is, is it in the national interest of this country to inventory the resources that are believed to be there? I happen to believe that the experience that we have had in Prudhoe Bay in maintaining the development in harmony with the environment and the ecology is one that can be improved upon if indeed there is oil in ANWR.

So, while the panel through one witness has expressed the opinion that there is no compromise, I would venture to say that as one reflects on the accuracy of the record, indeed there has been a compromise. The compromise is that we are only talking about a million and a half acres of 18 million acres. The reality is that the footprint is going to be much smaller if the oil is there than it was on Prudhoe Bay.

One has to ask one's self where would this Nation be today if we didn't have Prudhoe Bay which contributes about 23 percent of the domestic oil into the United States. Would we be able to fly into ANWR? It's a good question. Would it be an extraordinary luxury that just a few Americans could possibly get into if we were paying $3 and $4 and $5 a gallon for fuel? These are harsh realities.

And as we reflect on the matter before us today, I think it bears consideration that we are not talking about opening up the entire coastal plain to development. Those of you who have been there know that it is a huge, huge area, that Alaska is a huge, huge area. Those of you who have visited Prudhoe Bay and visited ANWR and observed the wildlife would, I think, come to the conclusion that many of the members of this committee did when they visited both Prudhoe Bay and ANWR this year that the abundance of wildlife currently in Prudhoe Bay exceeds that in ANWR. And there is no good reason for that, simply because it's just nature's dominance of wildlife at any given time.

So, I would urge, as we proceed with this hearing, to keep in mind that Alaskans are concerned. Alaskans are diligent and Alaskans do support a wilderness. And we are proud of the record we have made because no other State has done anything in a comparative manner to our sensitivity in maintaining our wilderness.

Senator WIRTH. Thank you very much, Senator Murkowski.

And we thank this panel very much for being with us this morning. Again, the record will remain open for any further comments that you all might like to make. Thank you very much.

If our second panel could please join us: Mr. Jim Campbell from Fairbanks, Alaska; Mr. Bob Dittrick from Anchorage, Alaska; Mr. Mike Smith, the Chairman of the Council for Yukon Indians from Whitehorse, Yukon; and Mr. Howard Linklater from Whitehorse, Yukon.

While the panel is joining us, perhaps Senator Ford, we might just note for the record that in terms of legislation introduced on the House side, there have been at least two bills introduced on this. One bill was introduced and referred to the Committee on Merchant Marine and Fisheries that was an attempt to do something not dissimilar from the legislation here, to have a 1002 study, a different kind of a formula for dividing the spoils, and it has a lot of environmental protection and some exploration-only provisions in it. That's one bill that has been introduced by some people over there.

Another bill was introduced by Congressman Udall, the Chairman of the Interior Committee, to create wilderness in the area.

Senator FORD. What I was referring to, Mr. Chairman, as I read the article—and I'm not sure where I read it, but that it was heralded around the committee as a possible compromise that apparently would fly at least on that side. And I'm not sure whether John Dingell was involved in that or not.

Senator WIRTH. I think it might go through the Merchant Marine Committee, but I would be surprised if that bill were to get through any time soon in the Interior Committee.

Senator FORD. I'm asking about it because by reading it appeared that the compromise had been reached, and that apparently will move on. And there was exploration in that compromise.

Senator WIRTH. That's right.

Senator FORD. That's proposed, and that's the reason I wanted to pose that question.

Senator **Wirth**. The House has at least two committees of jurisdiction: one, the Merchant Marine and Fisheries where this bill has been introduced; the other, the Interior——

Senator **Ford**. Which is Udall.

Senator **Wirth** [continuing]. Udall's committee and I think Congressman Young from Alaska is also on that committee. And he has introduced legislation to allow exploration. So, there are a number of bills over there.

All right. If you could all identify yourselves for the purposes of the recorder perhaps from right to left.

Mr. **Dittrick**. I'm Bob Dittrick from Eagle River, Alaska. It says Anchorage on there, but I'm a little outside of Anchorage.

Mr. **Campbell**. I'm Jim Campbell from Fairbanks, Alaska.

Mr. **Smith**. I am Mike Smith from the Yukon.

Mr. **Linklater**. Howard Linklater from Old Crow, Yukon, and not Whitehorse as it says there.

Senator **Ford**. What's the difference?

Mr. **Linklater**. I live in the northern Yukon, and Whitehorse is in southern Yukon.

Senator **Ford**. One is north; one is south.

Mr. **Linklater**. And it is a small Indian village.

Senator **Ford**. I understand south. [Laughter.]

Senator **Wirth**. Gentlemen, thank you very much for being here. You are familiar with the rules of the committee in which we would hope that you would be able to summarize your statement in five minutes or less. That will be included in full in the record. And the record will be open for further comments, questions that you might like to add.

If we could just start from right to left. And Mr. Dittrick, if we could start with you, that would be helpful, and move right down. Please proceed. Thank you very much.

STATEMENT OF BOB DITTRICK, EAGLE RIVER, AK

Mr. **Dittrick**. Thank you, sir.

I have come down from Alaska to talk to you because of many reasons, but one being that I am worried that there is a potential that my livelihood may be in jeopardy to some degree by the decisions that are before you today.

I own Wilderness Birding Adventures, a company that guides people into ANWR. ANWR is where I do most of my business right now. And the refuge is very important to me. And because I run rivers, I spend quite a bit of my time out on the coastal plain.

The economic benefits and the income that are generated by my modest business don't grab the imagination like the big bucks that we hear about that would be pumped into the economy by the oil companies. But I feel like that is a short-term vision and that when I go into the wilderness and take people into the wilderness, my industry is using the resource in a nonconsumptive way. And we leave the wilderness area there in as much value as the time that we went in there. And that leaves the wilderness there to be used over and over and over again at no decreased value where if the oil companies go in, they are going to be in there for a relatively short period of time, 30 years or so. They are going to leave the area in a degraded situation, and they are going to pump a lot of money into the economy and then go home.

And I ask you to look on a long-term basis at that with my industry being able to derive income and create business there indefinitely for an infinite period of time as opposed to a shorter term oil company situation. And I ask you to think into the future that some time after we are gone--all of us will be long gone—that my industry will outstride the oil industry. We'll be able to derive more income, have more economic benefit to the State.

During this time in the future, the wilderness is going to become more valuable also. Two hundred years ago everybody lived in the wilderness, and over the next 200 years it has been shrinking. And it is becoming harder and harder to find—excuse me. I lost my place here.

There's more and more people looking for it at the same time that the wilderness is shrinking. And this is just going to accelerate in the future. And therefore, the value of wilderness is going to continue to increase.

The future generations are the potential big losers here. And I would like for you to think of them when you are considering your decisions here. And I would like you to do an extraordinary thing, and that is, when you are thinking about your decisions, in your mind's eye summon those future generations in front of you so you can ask them some of these questions. And if you can imagine the trillions of people that we are talking about standing in front of you and you ask them whether they would rather that you make the decision to take whatever oil there might be in ANWR out for the "now" generation and degrading the wilderness in the process as opposed to leaving the wilderness for them to decide whether the wilderness values are more valuable than oil itself.

And I would just like to close by saying that I invited all of you to join me up there this summer, and I wanted to show you firsthand the values of the wilderness. And most of you graciously declined. But it broke my heart to read in my newspaper your comments and your feelings and what you experienced up there on a daily basis knowing that you were seeing it through a plexiglass window of an airplane, a device that actually by its nature ruins the essence of wilderness. So, I'm a little nervous that the fate of these decisions are in the hands of people with that perspective. But I really have faith that you are going to consider these future generations.

[The prepared statement of Mr. Dittrick follows:]

TESTIMONY OF BOB DITTRICK
BEFORE THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
RE: ARCTIC NATIONAL WILDLIFE REFUGE OIL DEVELOPMENT
OCTOBER 22, 1987

I've traveled from Alaska to be before you as someone whose ability to make a living could be jeopardized by your decisions. I own Wilderness Birding Adventures, a small company which leads wilderness trips into the Arctic Refuge.

The income and economic benefits to Alaska generated by my modest business and other wilderness outfitters don't grab the imagination like the mega-bucks associated with the oil industry. But this is a short-term view. The income generated in my industry is derived from the non-consumptive use of the resource. The resource is left in an undamaged condition, it retains its value and can be used over and over indefinitely. In fact, as populations grow in our future and the pressures of life on our planet intensify, the value of wilderness in true economic terms will increase. The oil industry will, on the other hand, pump large amounts of money into the economy for a mere 30 years, leaving the resource in a damaged condition and with a reduced value, then leave town. Although the income generated due to the 1002 area being in a wilderness condition is modest, it continues indefinitely. Therefore, at some point in the long-term future its economic benefit will outstride the oil industry. Granted, none of us will be here long enough to see it, but future generations will benefit, both as guides creating income and visitors discovering its therapeutic values.

Many of our greatest thinkers and heros have found it necessary to retreat to the wilderness to search their souls and gain true perspective. The ability of wilderness to rejuvenate the soul and spirit of man is priceless. We have no idea what lessons are yet to be learned from the study of intact, whole ecosystems, perhaps lessons invaluable to the existence of mankind. We will never know once it is gone. Man has become civilized, domesticated and the wilderness has shrunk. Two hundred years ago everyone lived near the wilderness on this continent -- now it has become hard to find. At the same time the wilderness is shrinking, more and more people are looking for it. This trend will only accelerate in the future, ever increasing the value of wilderness.

Future generations are the potential big losers; we are all lucky we will not be around to face their questioning. How would we explain to them why we used up all the oil, degrading the wilderness in the process, rather than taking advantage of our available technology to conserve energy and save some of the oil for them. Who knows what use they might find for the oil left them. Focusing their technology on yet unimagined discoveries, they may find values and uses for oil well beyond our comprehension.

The argument that we need Arctic oil for national security is a smoke screen. The present Administration has recently opposed conservation efforts that would save enough oil to make the development of the Arctic unnecessary. If relatively small amounts of oil like those predicted to be found under the Arctic Refuge are truly crucial to our national security, these conservation steps would not have been derailed. No, it is not national security that creates the pressure to open the Arctic to oil development, it is the right of our generation to be wasteful that is being argued.

I ask that while you ponder your decisions you allow your mind's eye to summon up the image of future generations. With all those people standing there before you, the trillions who will live long after we are gone, ask them whether they would prefer you decide to take the oil -- if there is any -- from the Arctic Refuge for the economic gain of a few in this generation, or would they rather you left them the wilderness and whatever oil might or might not be there. Here you will find your first true consensus on this topic. The oil of the Arctic should be left in the ground for now, saved for future generations. We don't need it now; let them decide which is more valuable -- the possibility of oil or the wilderness.

I invited each of you to join me, at my cost, in the wilderness of the Arctic last summer. I wish I could have afforded to take you free of charge and compete with the Department of Interior or the oil companies. Most of you graciously declined. I was hoping to give you first-hand experiences and let you feel the values of this great wilderness. It truly broke my heart to read daily in my morning newspaper about your travels, experiences, impressions and comments as you traveled throughout Alaska's arctic. I couldn't get out of my mind the image of you flying around in various types of aircraft experiencing the wilderness through a plastic shield with either and administration bureaucrat or an oil industry executive continuously distracting you. I am nervous that the fate of this wonderful place -- a place I love -- lies in the hands of people whose perspective has come from a modern contraption, which by its very nature ruins the essence of wilderness. I have faith that you will consider the future generations, and wonder what wilderness they will have in which to find their greatness and rejuvenate their spirits. I can only hope you will come from your hearts on this one.

Senator Wirth. Thank you very much, Mr. Dittrick.

Mr. Campbell.

STATEMENT OF JIM CAMPBELL, FAIRBANKS, AK

Mr. Campbell. Yes. I'm Jim Campbell. And I am here before you today on behalf of myself, but to urge you to vote against any oil development in ANWR and to give the coastal plain the wilderness designation that it deserves.

I am not a scientist or an oil geologist or a professional environmentalist. So, I'm not here to give you any more facts or figures, statistics or anything. But what I do want to talk about are my experiences and feelings in connection with the land in the refuge.

It is beyond me, but for some reason these things seem to be perceived by some as having no value or measurable worth. But in my business the quality of people's experiences in their interaction with the land is the only thing that counts.

I have run a wilderness guiding business in ANWR for the last 8 years leading hiking and rafting trips throughout the refuge. And in my days and weeks spent there, I haven't gathered a single bit of data. Instead, I've been gathering experiences which are beyond most people's comprehension. I have had to pull over while floating down a river because there were thousands of caribou cows and calves crossing the river below us. I have been confronted by a grizzly bear who was protecting its kill. I've seen wolves hunting ducks in a river which was quite hilarious. I've seen hawks chasing eagles away from their nests.

And I've climbed to the summit of an unnamed peak overlooking the whole coastal plain where one sweep of the eye encompasses hundreds of miles, and below lay the whole length of the river that I just traveled plus ridge upon ridge of mountains that boggles the mind to see such vastness. And I could almost see the curvature of the earth. Anyway, with a little imagination you could definitely feel like you could see the curvature of the earth. And the expanse of the coastal plain melded into the still-frozen arctic ocean whose whiteness just disappeared into the far horizon. But it felt like I was standing on top of the world. I mean, it's just an indescribable feeling to feel like you are actually looking at the globe itself curving away before you.

But the greatest satisfaction actually comes from sharing these life-stirring experiences with hundreds of other people, people who have come from all over the world seeking this sort of experience, this sort of land. They come to ANWR because it is one of the last great, true wildernesses left in the world.

"Wilderness" has become a very relative and artificial term, often describing land that has been compromised, diluted or limited. Our world, even in our parks and refuges, is full of pseudo-wilderness. Almost wild lands with controlled and careful development isn't true wilderness. And ANWR is a living definition of absolute wilderness. That is why there can be no compromise here. No development without impact is sort of contradictory I guess. But there is only true untouched wilderness or developed land. There are no in-betweens. You know, wilderness is wilderness.

So, imagine flowing out onto the coastal plain along with the melt water from the highest peaks of a mountain range and then to its final, natural destination, the ocean, not seeing anything but true, untouched wild land, drinking water directly from the river. The Arctic Refuge in this country that this can be done. So, I personally invite you right now to come experience this, to flow with the elemental force of life actually.

[The prepared statement of Mr. Campbell follows:]

ARCTIC
TREKS
Box 73452 • Fairbanks, Alaska 99707
Phone (907) 455-6502

October 22, 1987

Honorable Bennett Johnson (Chairman)
Senate Energy & Natural Resources Committee
U. S. Senate
Washington, D.C. 20510

Dear Chairman and Senators:

My name is Jim Campbell. I'm here before you today to urge you to vote against any oil development in ANWR and to vote instead to give the coastal plain the wilderness designation it deserves.

I'm not a scientist, oil geologist or professional environmentalist, so I'm not here to give you more facts, figures and statistics. What I do want to talk with you about are my experiences, my feelings, my connection with the land in the Arctic National Wildlife Refuge. For some reason, these things seem to be percieved by some as having no value or measurable worth. But in my business, the quality of people's experiences, their interaction with the land, is the only thing that matters.

I've run a wilderness guiding business in ANWR for the last 8 years, leading hiking and rafting trips throughout the refuge, including the coastal plain. In my days and weeks spent in ANWR I haven't gathered a single bit of "data". Instead, I've been gathering experiences--experiences beyond many people's comprehesion.

I've had to pull over to shore while rafting because thousands of caribou cows and calves were crossing the river below us.

I've been confronted by a grizzly protecting its caribou kill, watched wolves hunting, heard an eagle's scream pierce the sky.

I've climbed to the summit of an unnamed peak overlooking the coastal plain where a sweep of the eye encompassed a hundred miles. Below lay the whole length of the river I'd just travelled, plus ridge after ridge of mountains extending to three horizons. Looking north, I could almost see the curvature of the earth as the expanse of the coastal plain melded into the still frozen Arctic Ocean, whose whiteness disapppeared into the rounded horizon. It felt like I was at the top of the world.

Wilderness Backpacking and Rafting in Alaska's Brooks Range

But the greatest satisfaction comes from sharing these life-stirring experiences with hundreds of other people--people who come from all over the world seeking this sort of experience, this sort of land. They come to ANWR because it's one of the last great, true wildernesses left in our world.

"Wilderness" has become a very relative, artificial term, often describing land that has been compromised, diluted, limited. Our world--even in our parks and refuges--is full of psuedo-wilderness, almost-wild lands, with "controlled and careful" development.

ANWR is our living definition of absolute wilderness. That is why there can be no compromise here--no "development without impact". There is only true untouched wilderness or developed land--the terms are mutually exclusive.

If my plea to preserve a wild land that is undiminished, whole, vast beyond compare does not move you, then perhaps it is a reflection of your soul that has become compromised, limited and diminished. For the loss is ultimately in human terms--in the range, depth and richness of human experience available--when we destroy or diminish the natural world around us.

Sincerely,

Jim Campbell

Senator WIRTH. Thank you very much, Mr. Campbell.

Mr. Smith.

STATEMENT OF MIKE SMITH, CHAIRMAN, COUNCIL FOR YUKON INDIANS, WHITEHORSE, YUKON

Mr. SMITH. Thank you.

Honorable Senators, I would first like to——

Senator WIRTH. If you could pull the microphone over quite close, Mr. Smith, I'd appreciate it. Thank you.

Mr. SMITH. Yes, thank you.

I would first like to express my thanks for having the opportunity to speak before this committee.

My name is Michael Smith and I am the Chairman of the Council for Yukon Indians, an organization representing Yukon Indian nations. I would like to briefly state the position taken by the Yukon Indian nations with regard to the proposed oil and gas development and will then ask my friend from Old Crow, Mr. Howard Linklater, to address the specific concerns of his home community.

We are currently negotiating a land claim agreement with the Canadian government which, amongst other things, will secure our right in perpetuity to participate in traditional hunting, trapping and fishing activities. Our position is that we support the retention of those lands in question as a wildlife area, and we oppose any development which may displace the calving grounds of the porcupine caribou herd.

With the great uncertainty about the impact of the development, I urge this committee to consider our view that only wilderness designation for the 1002 lands area can provide with certainty a sustainable supply of caribou essential for the cultural integrity of our people.

Thank you for this opportunity, and I now ask that you listen briefly to the words of Mr. Howard Linklater. Thank you.

[The prepared statement of Mr. Smith follows:]

HONORABLE SENATORS, I WOULD FIRST LIKE TO EXPRESS MY THANKS FOR HAVING THE OPPORTUNITY TO SPEAK BEFORE THIS COMMITTEE.

MY NAME IS MIKE SMITH AND I AM CHAIRMAN OF THE COUNCIL FOR YUKON INDIANS WHICH IS AN UMBRELLA ORGANIZATION RESPONSIBLE FOR CO-ORDINATING THE SETTLEMENT OF A LAND CLAIM FOR THE 6,000 INDIAN PEOPLE IN CANADA"S YUKON TERRITORY.

I WOULD LIKE TO BRIEFLY STATE THE POSITION TAKEN BY YUKON INDIANS WITH REGARDS TO THE PROPOSED OIL AND GAS DEVELOPMENT AND WILL THEN ASK MY FRIEND FROM OLD CROW, MR. HOWARD LINKLATER TO ADRESS THE SPECIFIC CONCERNS OF HIS HOME COMMUNITY.

A MAIN OBJECTIVE OF THE LAND CLAIM WHICH WE ARE CURRENTLY NEGOTIATING WITH THE FEDERAL GOVERNMENT IS TO SECURE FOR ALL YUKON INDIAN PEOPLE THE OPPORTUNITY TO PARTICIPATE IN TRADITIONAL HUNTING, TRAPPING AND FISHING ACTIVITIES.* TO DRAW A COMMON THREAD BETWEEN THE WAYS OF OUR PEOPLE AND THOSE OF YOUR GREAT NATION ONE MIGHT SAY THAT FOR US TO LIVE OFF THE LAND IS AN UPDATED VERSION OF WHAT WE BELIEVE TO BE OUR "MANIFEST DESTINY".

THE BELIEF EXISTS IN YUKON TODAY THAT ALL INDIAN FAMILIES ORIGINALLY DESCENDED FROM TWO CLANS, THE WOLF CLAN AND THE RAVEN CLAN. AS A RESULT WE SHARE A SENSE OF COMMON ANCESTRY AND ANY DISPLACEMENT OF THE PORQUPINE CARIBOU HERD WHICH WILL DIRECTLY AFFECT THE COMMUNITIES OF OLD CROW, DAWSON AND MAYO WILL SIMILARILY DIMININISH THE CULTURAL INTEGRITY AND PRIDE OF ALL YUKON INDIANS.

OUR STAND AGAINST OIL AND GAS DEVELOPMENT DOES NOT REST ON SUPERSTITION BUT ON THE FACT THAT FINAL REPORT/LEGISLATIVE ENVIROMENTAL IMPACT STATEMENT OF THE U.S. DEPARTMENT OF THE INTERIOR NOTES THAT "THE AMOUNT OF (PORQUPINE CARIBOU) HERD REDUCTION AND ITS LONG TO SIGNIFICANCE TO HERD VIABILITY IS HIGHLY SPECULATIVE". (pp. 165) I ASK MEMBERS OF THIS COMMITEE TO REVIEW IN DETAIL OTHER CRITICISMS OF THE LEGISLATIVE ENVIROMENTAL IMPACT STATEMENT PRESENTED IN OUR WRITTEN SUBMISSION BEFORE YOU TODAY.

GIVEN THE GREAT DEAL OF UNCERTAINTY AROUND THE IMPACT OF THIS DEVELOPMENT ON THE PORQUPINE CARIBOU HERD I URGE THIS COMMITTEE TO CONSIDER OUR VIEW THAT ONLY WILDERNESS DESIGNATION FOR THE 1002 AREA CAN PROVIDE, WITH CERTAINTY, A SUSTAINALBLE SUPPLY OF MIGRATORY CARIBOU ESSENTIAL FOR THE CULTURAL SURVIVAL OF OUR PEOPLE.

THANK-YOU FOR THE OPPORTUNITY TO SPEAK AND I NOW ASK THAT YOU LISTEN BRIEFLY TO THE WORDS OF MR. HOWARD LINKLATER FROM THE COMMUNITY OF OLD CROW , ...

THANK-YOU MIKE, HONORABLE SENATORS, I WELCOME THIS OPPORTUNITY TO SPEAK ON THE BEHALF OF MY PEOPLE FOR A CAUSE WHICH IS SO VITALLY IMPORTANT TO OUR DAY-TO-DAY EXISTENCE.

OLD CROW IS A SMALL VILLAGE OF ABOUT 300 ABORIGINAL MEN, WOMEN, CHILDREN AND ELDERS. IT IS LOCATED WHERE THE CROW RIVER MEETS THE PORQUPINE RIVER, A SPOT CHOSEN SPECIFICALLY BECAUSE IT IS ALONG THE MIGRATION ROUTE OF THE PORQUPINE CARIBOU HERD.

ARCHAEOLOGICAL EVIDENCE SUGGESTS THAT OUR PEOPLE HAVE EXISTED IN THIS REGION AND MAINTAINED A LIFESTYLE DEPENDENT ON THE HARVEST OF CARIBOU FOR AT LEAST 30,000 YEARS. I ASK THIS COMMITTEE TO APPRECIATE THAT IN THE MINDS OF PEOPLE IN OLD CROW SUCH A "SCIENTIFIC" ASSUMPTION HAS VERY LITTLE CONCRETE MEANING. OUR LIFESTYLE DEPENDENT ON THE CARIBOU HAS EXISTED TIME IMMEMMORIAL.

TO THIS DAY OUR CULTURE REMAINS STRONGLY TIED TO THE LAND. IT HAS BEEN ESTIMATED THAT WE OBTAIN ONE-HALF OF OUR NUTRITINAL REQUIREMENTS FROM FOOD HARVESTED OFF THE LAND, AND OF THIS OUR HARVEST FROM THE PORQUPINE CARIBOU HERD IS BY FAR THE MOST IMPORTANT. EACH FAMILY REQUIRES AT LEAST SEVEN CARIBOU EACH YEAR IN ORDER TO MEET THEIR NUTRITIONAL REQUIREMENTS.

WHAT I WOULD LIKE TO STRESS BEFORE YOUR COMMITTEE TODAY IS THE FACT THAT THE HARVEST OF CARIBOU MEETS NOT ONLY NUTRITIONAL REQUIREMENTS BUT IS THE FOCAL POINT OF MANY OF THE CULTURAL VALUES WHICH ARE SHARED AMONG OUR COMMUNITY.

THE HARVEST CONTINUES TO BE A POWERFUL EDUCATIONAL TOOL FOR OUR YOUNG. IT IS THE VEHICLE FROM WHICH THE LESSONS OF OUR ELDERS ARE PASSED FROM OLD TO YOUNG.

THE HARVEST IS NOT SIMPLY AN ACTIVITY WHICH INVOLVES THE HUNTER AND THE HUNTED, BUT INOLVES A NETWORK OF FAMILY, FRIENDS AND NEIGHBOURS WHO COOPERATIVELY SHARE IN THE THE WORK TO BE DONE AND THE GOODS TO BE PRODUCED.

THE SKINS OF CARIBOU CONTINUE TO BE USED TO PROVIDE THE HIGHEST QUALITY OF COLD-WEATHER CLOTHING... AND AS I AM SURE YOU CAN APPRECIATE LIFE ABOVE THE ARCTIC CIRCLE IS COLD INDEED!

WE HAVE READ U.S. GOVERNMENT REPORTS WHICH ARGUE THAT THERE IS LITTLE RISK IN THE DEVELOPMENT ON THE 1002 LANDS. AS MIKE HAS INDICATED WE HAVE GRAVE DOUBTS OVER THE INTEGRITY OF THE LEGISLATIVE ENVIROMENTAL IMPACT STATEMENT. WE ARE CONFOUNDED AS TO WHY THIS REPORT MAY CONCLUDE ON ONE HAND THAT "MAJOR" IMPACT IS EXPECTED TO THE CARIBOU AS A RESULT OF THE DEVELOPMENT WHILE ON THE OTHER THE REPORT ANTICIPATES THAT "NO APPRECIABLE POPULATION DECLINE IS EXPECTED". IN LIGHT OF THESE FACTS YOU MUST THEREFORE UNDERSTAND THE SKEPTICISM WITH WHICH WE VIEW THE PROPOSED DEVELOPMENT IN ALASKA. RATHER THAN RISK PERMANENT DISRUPTION OF THE LAST GREAT WILDERNESS LEFT ON THE CONTINENT OF NORTH AMERICA WE ASK THAT THIS COMMITEE PURSUE LEGISLATION IN FAVOR OF FULL WILDERNESS DESIGNATION.

THANK-YOU, MIKE AND MYSELF WOULD NOW BE GLAD TO ANSWER ANY QUESTIONS YOU MIGHT HAVE ARISING FROM THE COMMENTS WE HAVE MADE.

COUNCIL FOR YUKON INDIANS

POSITION PAPER

SUBMITTED TO:
THE UNITED STATES SENATE COMMITTEE ON ENERGY AND RESOURCES

RECOMMEMDATIONS FOR WILDERNESS PRESERVATION OF 1002 LANDS

October 19, 1987
Land Claims Department
Council for Yukon Indians.

Introduction

In April of 1987 the United States Department of the Interior (USDI), concluded in its Final Report/Legislative Environmental Impact Statement, (FR/LEIS), that Congress approve full leasing for oil and gas development on the "1002 lands" of the Arctic Coastal Plain. The Council for Yukon Indians, (CYI), is an umbrella organization responsible for coordination of land claim negotiations with the federal government on behalf of 6,000 Yukon Indians. In the interest of our people the CYI stands firmly against any oil and gas development on the 1002 lands. We take this position in unanimity with the Canadian federal government and Yukon territorial assembly. Our views on this development were first set out in a presentation made by Vice-Chairman of of Economic Development, James Allen, at public hearings held by the Department of the Interior in the winter of 1987. (see Appendix A attached)

The CYI Position

The Council for Yukon Indians is solely interested in promoting full wilderness protection for the 1002 area. We are of the opinion that only wilderness designation can provide, with certainty a sustainable supply of migratory caribou harvested in the northern Yukon territory. The CYI believes that the FR/LEIS unduly emphasizes the perceived gains to be made through oil and gas leasing. It does this while shirking the responsibility to fully address the impact loss of wilderness habitat will have on the native who people subsist, in a physical and cultural sense, on the harvest of wildlife species.

Our gravest concern in this regard is for the potential impact of oil and gas leases on the migratory Porqupine Caribou Herd, which is used extensively by the Yukon Indians of Old Crow, Mayo and Dawson. In our first presentation to the Department of the Interior, the CYI stated emphatically that the Draft Report/LEIS merely paid lip-service to the consequences of transboundary issues such as those pertaining to the PCH. The FR/LEIS has not adequately met the concerns which we initially raised. According to the FR/LEIS "The amount of herd reduction and its long term significance to herd viability is highly speculative" (pp.165).

The Department of the Interior's decision to reject U.S. Fish and Wildlife's recommendation that caribou calving grounds be classified as Resource Category 1 habitat is unaceptable to the CYI. (Resource Category 1 habitat is defined as that of high value for evaluation species and as that considered unique and irreplaceable on a national basis or in the ecoregion-[pp109]). The FR/LEIS opts for the purposes of its "broad programmatic analysis" to designate the entire 1002 area as Resource Category 2 habitat (pp 109). The CYI believes that the FR/LEIS does not demonstrate that the calving grounds are "replaceble" and therefore the strictest protection -wilderness designation- ought to be afforded the 1002 lands. In fact the decision to designate the lands as Resource Category 2 habitat seems to conflict with a comment made later in the FR/LEIS which stated that "geography apparently limits the availability of suitable alternative calving or insect-relief habitats" (pp.165).

The CYI also believes that the decision to delete the term "core-calving grounds" in favor of "concentrated calving grounds" is inappropriate and misleading. Figure II-5 of the FR/LEIS leaves little doubt that the south-west corner of the 1002 ought to be distinguished as a core-calving area. (see Apppedix B attached) We are also confounded as to why the FR/LEIS concludes on one hand that "major effects could result,(to the PCH), if the entire 1002 area was leased"; while stating on the other that "no appreciable population decline is expected. (parentheses and emphasis added) These contradictory statements and other outlined above leave the Cyi with serious doubts regarding the future of caribou so vital to the livelihood of Yukon Indians.

Conclusion

Dimininshing populations of migratory animal species could have a direct impact on the social, cultural and economic prosperity of the Old Crow, Mayo and Dawson Indian Bands. A disruption such as this means that the cultural integrity and pride of all Yukon Indians will be similarily diminished.

Our principle concern with regards to the proposed oil and gas development is that the the FR/LEIS does not adequately address potential consequences to the Porcupine Caribou Herd in the North Yukon. The issue before U.S. politicians is one of internationa maginitude and as has considerable potential to create undesirable spillover effects for Indian people throughout the Yukon.

The CYI hopes that our lobby will convince U.S. politicians to critically examine the USDI's FR/LEIS and their subsequent approval of "full-leasing" for the 1002 lands. Only wilderness designation can ensure that species dependent on the 1002 lands will sustain the ancient relationship of Yukon Indians to the natural environment.

APPENDIX A

PRESENTATION TO THE PUBLIC HEARINGS ON THE ANILCA SECTION 1002 REPORT

Anchorage, Alaska
January 6, 1987

by

JAMES ALLEN

Vice-Chairman
Economic Development Department

Council for Yukon Indians

(MR/MS CHAIRMAN/PERSON, DEAR PANEL MEMBERS):

IT IS WITH A GREAT DEAL OF ANTICIPATION THAT I HAVE BEEN LOOKING FORWARD TO SPEAK, ON BEHALF OF THE COUNCIL FOR YUKON INDIANS, BEFORE THIS PUBLIC HEARING TODAY.

ALLOW ME, FIRST OF ALL, TO COMMEND THE UNITED STATES INTERIOR DEPARTMENT FOR THE IMPORTANT FORUM IT HAS PROVIDED HERE.

FOR YOUR INFORMATION, THE COUNCIL FOR YUKON INDIANS IS AN UMBRELLA ORGANIZATION REPRESENTING APPROXIMATELY 6,000 YUKON INDIANS, WHO ARE CURRENTLY NEGOTIATING, WITH THE GOVERNMENT OF CANADA, A COMPREHENSIVE LAND CLAIM SETTLEMENT IN THE YUKON.

MY REASON FOR BEING SO ANXIOUS TO MEET THIS PANEL TODAY, IS NOT ONLY BECAUSE MANY OF MY PEOPLE IN THE YUKON SHARE FAMILY TIES WITH MANY OF OUR ABORIGINAL ALASKAN NEIGHBOURS, BUT ALSO BECAUSE WE FREQUENTLY SHARE THE SAME RESOURCES.

BY THIS I MEAN CERTAIN WILDLIFE RESOURCES - WILDLIFE WHICH DOESN'T KNOW OF BOUNDARIES BUT FREELY CROSSES BETWEEN ALASKA AND THE YUKON, SUCH AS THE MIGRATING PORCUPINE CARIBOU HERD, BECAUSE IT REQUIRES A LARGE HABITAT TO SURVIVE.

AMONG THE MUTUAL PROBLEMS OF ABORIGINAL PEOPLE ON BOTH SIDES OF OUR BORDER, I AM CERTAIN, PERHAPS THE MOST COMMON IS THAT IN THE RECENT PAST WE OFTEN HAD TO REFUTE ARGUMENTS FROM OUR GOVERNMENTS AND INDUSTRY THAT WE NO LONGER NEED OR USE OUR TRADITIONAL WILDLIFE RESOURCES AS WE ONCE DID ...

LET ME ASSURE YOU, THIS IS SIMPLY NOT SO. HUNTING, FISHING AND TRAPPING BY NATIVE NORTHERNERS ARE FAR FROM BEING THE HISTORIC RELICS OR CULTURAL LEGACIES SOME CRITICS TRY TO MAKE THEM.

QUITE TO THE CONTRARY, OUR HARVEST OF WILDLIFE RESOURCES IS AN ON-GOING, LEGITIMATE ECONOMIC ACTIVITY. TRANSLATED INTO HARD CASH - (IF WE MUST PUT A PRICE TAG ON IT) - THE WORTH OF THE ANNUAL SUBSISTENCE ECONOMY TO THE YUKON AMOUNTS TO MILLIONS OF DOLLARS. WHILE ITS SOCIAL VALUE CANNOT BE PUT INTO MONETARY TERMS, OUR SUBSISTENCE ECONOMY HAS REMAINED CENTRAL TO THE YUKON INDIAN WAY OF LIFE.

IN PARTICULAR, THE IMPORTANCE OF THE PORCUPINE CARIBOU HERD TO NORTHERNERS HAS BECOME EVIDENT TO ALL THOSE WHO HAPPEN TO LIVE IN COMMUNITIES WHOSE ABORIGINAL RESIDENTS DERIVE THEIR NUTRITION FROM THE SEASONAL HARVEST OF THE HERD.

ONE OF THE KEY ELEMENTS TO THE SUCCESSFUL SETTLEMENT OF THE YUKON INDIAN LAND CLAIM IS MY PEOPLE'S GUARANTEED ACCESS TO WILDLIFE, BOTH IN TERMS OF HARVEST AND MANAGEMENT RIGHTS. THE GOVERNMENTS OF CANADA AND YUKON RECOGNIZE THIS FACT.

TO THE COMMUNITIES IN THE NORTHERN YUKON, BUT FIRST AND FOREMOST TO OLD CROW, THE SURVIVAL OF THE 150,000-STRONG PORCUPINE CARIBOU HERD IS, OF COURSE, JUST AS CRUCIAL.

REGARDING THE PORCUPINE CARIBOU, WE CAN REPORT SIGNIFICANT RESULTS.

THE FIRST MILESTONE (BY OCTOBER 1985) WAS A 'MADE IN CANADA' PORCUPINE CARIBOU HERD AGREEMENT. IT WAS STRUCK BETWEEN THE YUKON AND NORTHWEST TERRITORIES, AND BETWEEN THREE LEVELS OF GOVERNMENT AND THREE NATIVE ORGANIZATIONS.

WITH THE SIGNING OF THIS AGREEMENT, THE ABORIGINAL PEOPLE OF THE TWO CANADIAN TERRITORIES ACHIEVED A MAJOR ROLE IN TERMS OF THE MANAGEMENT OF THE HERD. THIS PROGRESSIVE EVENT, WE KNOW, WILL ENSURE THAT THE HERD WILL SURVIVE FOR MANY GENERATIONS TO COME.

THE SECOND MILESTONE (BY DECEMBER 1986) WAS THE SIGNING OF THE TENTATIVE DRAFT OF A CANADA - UNITED STATES AGREEMENT FOR THE INTERNATIONAL MANAGEMENT OF THE PORCUPINE CARIBOU HERD.

I AM PERSONALLY CONCERNED, HOWEVER, THAT THE LATTER AGREEMENT DOESN'T INCLUDE PROVISIONS PERTAINING TO THE UNITED STATES' PROPOSALS TO OPEN UP THE ALASKAN COASTAL PLAIN FOR OIL AND GAS DEVELOPMENT.

AND THIS BRINGS ME TO THE PURPOSE OF THIS HEARING.

THE PORCUPINE CARIBOU CALVING GROUNDS, AS WE ARE WELL AWARE, FALL INTO THAT FAIRLY NARROW AND ECOLOGICALLY FRAGILE STRIP OF COASTAL PLAIN BETWEEN THE BRITISH MOUNTAINS AND THE BEAUFORT SEA ... WHEREBY THE LARGER PORTION OF THE HERD'S CALVING GROUNDS LIE IN THE ALASKAN ARCTIC WILDLIFE REFUGE.

THE 'UNITED STATES RESOURCE ASSESSMENT' IN FRONT OF ME, LADIES AND GENTLEMEN, PROPOSES FULL LEASING ... OR, WITH OTHER WORDS ... THE OPENING OF THE ALASKAN COASTAL PLAIN FOR OIL AND GAS EXPLORATION AND PRODUCTION ACTIVITIES.

IN MY MIND, THIS MEANS THAT A LOT OF NORTHERN PEOPLE WILL SUFFER - VERY MUCH SO, I AM AFRAID, SINCE THE REPORT GOES ON TO ADMIT TO THE REAL POSSIBILTIES OF NEGATIVE IMPACTS ON THE PORCUPINE CARIBOU HERD AND OTHER WILDLIFE RESOURCES.

MORE SPECIFICALLY, I UNDERSTAND THE REPORT TO SAY THAT OIL AND GAS DEVELOPMENTS MAY AFFECT 78% OF THE TOTAL ALASKAN PORCUPINE CARIBOU CALVING GROUNDS ... (I URGE YOU TO EXAMINE THIS PERCENTAGE FIGURE IN VIEW OF NO, OR AT LEAST VERY LITTLE, OTHER AVAILABLE REPLACEMENT HABITAT).

WITH RESPECT TO A PROJECTION OF CARIBOU POPULATION DECREASE, I FURTHER UNDERSTAND THE REPORT TO SAY, THAT BETWEEN 10% AND 40% OF THE HERD MAY POSSIBLY BE AFFECTED.

BEYOND THE IMPACTS ON CARIBOU, ADVERSE IMPACTS, WE ARE TOLD, CAN BE ANTICIPATED FOR WATER FOWL, MUSKOX AND POLAR BEARS.

IN PLAIN LANGUAGE, THE REPORT TELLS THAT THE PORCUPINE CARIBOU HERD, FOR ONE, IS IN SERIOUS DANGER OF BEING DRASTICALLY REDUCED.

PERHAPS AS ALARMING ... THE HERD, IF DISTURBED, MAY CHANGE ITS MIGRATORY PATTERNS. THIS MEANS, THAT THE HERD COULD BYPASS THE COMMUNITY OF OLD CROW, AND TO DO SO AT SUCH A DISTANCE THAT IT WOULD HAVE THE SAME RESULT AS A REDUCTION OF THE HERD ITSELF.

FOR OLD CROW IN THE NORTHERN YUKON, CARIBOU IS AND HAS BEEN, SINCE THOUSANDS OF YEARS, MY PEOPLE'S LIVELIHOOD. FOR YUKON INDIANS ANY DISTURBANCE TO THE PORCUPINE CARIBOU HERD IS THEREFORE UNACCEPTABLE.

FOR THE RECORD, LET ME MAKE MYSELF PERFECTLY CLEAR: OIL AND GAS LEASES GRANTED ON THE ALASKAN COASTAL PLAIN, AND WITHIN THE HERD'S CALVING GROUNDS, ARE EQUALLY UNACCEPTABLE TO US.

I SPOKE EARLIER OF THE SHARING, BY ALASKAN AND YUKON ABORIGINAL PEOPLE ALIKE, OF MIGRATORY WILDLIFE RESOURCES. WHAT WE ARE REALLY TALKING ABOUT, ARE OUR INTERNATIONAL WILDLIFE RESOURCES.

IN THIS SENSE, MY PERHAPS MOST IMPORTANT POINT IS THAT THE 'UNITED STATES RESOURCE ASSESSMENT' REPORT HAS FAILED TO EXAMINE THE TRANSBOUNDARY EFFECTS OF ALASKAN OIL AND GAS ACTIVITIES. ON THIS LAST ACCOUNT, AS WELL, THE REPORT ITSELF IS UNACCEPTABLE TO US.

LET ME CLOSE BY SAYING, THAT PRIOR TO ARRIVING HERE AS AN INTERVENOR BEFORE THIS PANEL, I HAVE SCRUTINIZED MY ARGUMENTS AND MOTIVES CAREFULLY.

IF YOU WILL, ALASKA AND THE YUKON ARE NEIGHBOURS SHARING THE SAME BACKYARD. I THEREFORE APPEAL TO YOU, AND ON BEHALF OF YOUR YUKON INDIAN NEIGHBOURS, TO GIVE OUR CONCERNS THE ATTENTION THEY DESERVE. I APPEAL TO YOU TO ACKNOWLEDGE US AS YOUR CANADIAN PARTNERS IN THE MANAGEMENT AND PRESERVATION OF OUR WILDLIFE RESOURCES ON WHICH, WHETHER YOU LIKE IT OR NOT, WE DEPEND ON BOTH SIDES OF THE BORDER.

I FULLY BELIEVE THIS TO BE AN ATTAINABLE OBJECTIVE.

THANK YOU.

APPENDIX B.

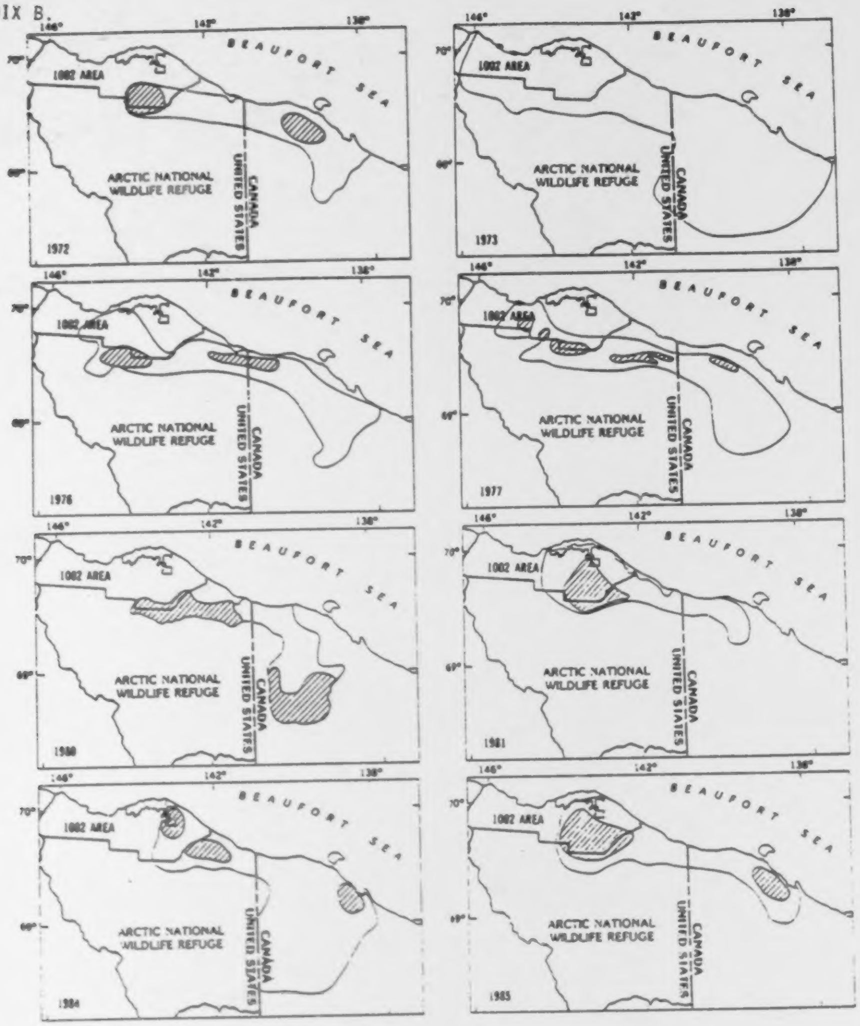
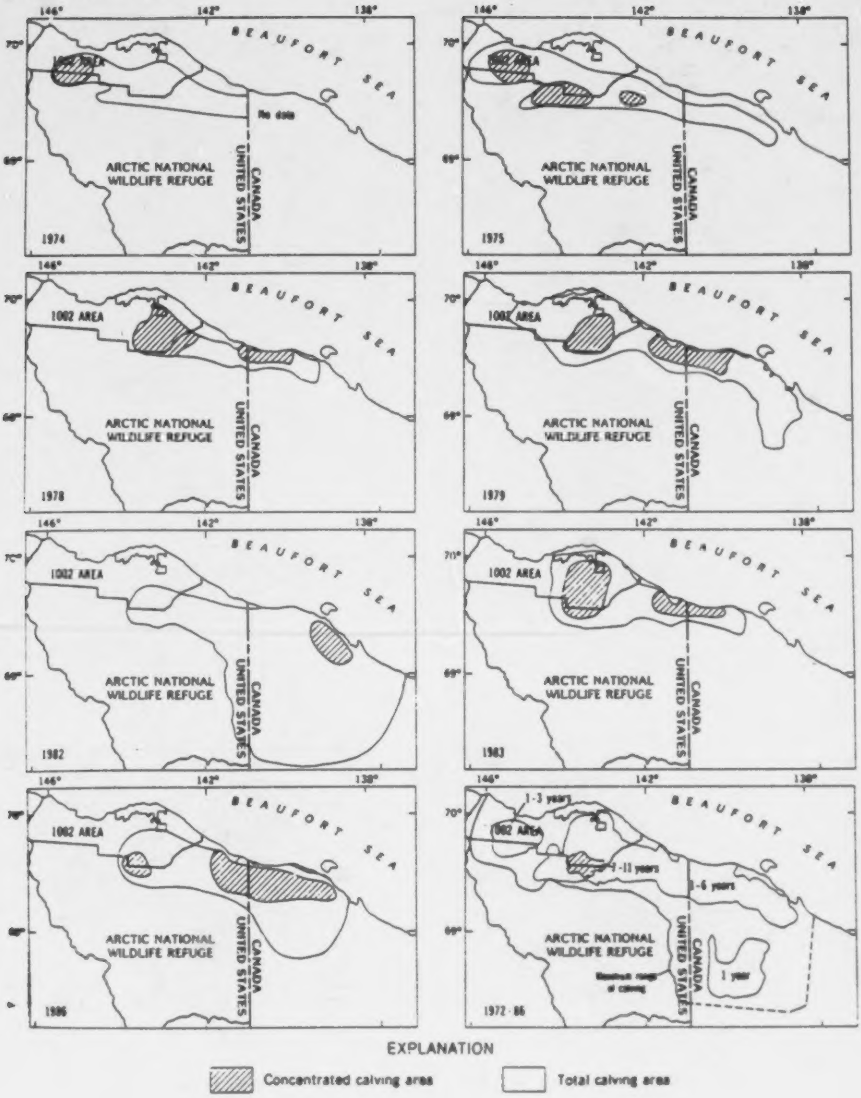

146°
142°
138°
70°
69°
BEAUFORT SEA
1002 AREA
ARCTIC NATIONAL WILDLIFE REFUGE
CANADA
UNITED STATES
1972
1973
1976
1977
1980
1981
1984
1985

Figure II-5.—Total calving areas and concentrated areas of the Porcupine caribou herd by year for 1972-86 (15 maps) and composite map of all concentrated calving areas for 1972-86, including maximum extent of scattered calving (1 map).

APPENDIX B (cont'd)


146°
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BEAUFORT SEA
1002 AREA
No data
ARCTIC NATIONAL WILDLIFE REFUGE
CANADA
UNITED STATES
1974
1975
1978
1979
1982
1983
1986
1972-86
1-3 years
7-11 years
1-6 years
1 year
Maximum range of calving
EXPLANATION
Concentrated calving area
Total calving area

Senator WIRTH. Thank you very much, Mr. Smith.
Mr. Linklater.

STATEMENT OF HOWARD LINKLATER, OLD CROW, YUKON

Mr. LINKLATER. Yes. I welcome this opportunity to speak on behalf of my people for a cause which is so vitally important to our day-to-day existence.

Old Crow is a small village with about 300 aboriginal men, women and children. It is located where the Crow River meets the Porcupine River, a spot chosen specifically because of it's along the migration route of the porcupine caribou herd.

Archaeological evidence suggests that our people have existed in this region and maintained a lifestyle dependent on the harvest of the caribou for at least 30,000 years. I ask that this committee appreciate that in the minds of the people of Old Crow, such a scientific assumption has very little concrete meaning. Our lifestyle, dependent on the caribou, has existed since time immemorial.

To this day our culture remains strongly tied to the land. It has been estimated that we obtain one-half of our nutritional requirement from food harvesting off the land, and of this our harvest from the porcupine caribou is by far the most important. Each family requires at least seven caribou each year in order to meet its nutritional requirements.

What I would like to stress before your committee today is the fact that the harvest of the caribou meets not only our nutritional requirements, but the focal point of many of our cultural values, which are shared among our community.

The harvest continues to be a powerful educational tool for our young as a vehicle from which the lessons of our elders are passed from old to young.

The harvest is not simply an activity which involves the hunter and the hunted, but it involves a network of family, friends and neighbors who cooperatively share in the work to be done and the goods to be produced.

The skins of caribou continue to be used to provide the highest quality of cold-weather clothing. And as I am sure you can appreciate, life above the arctic circle is cold, indeed.

We have read U.S. Government reports which argue there is very little risk in the development of the 1002 lands. We have grave doubts about the integrity of the legislative environmental impact statement. We are confounded as to why this report may conclude, on the one hand, that major impact is expected on the caribou as a result of development, while on the other hand, the report anticipates that no appreciable population decline is expected.

In light of these facts, you must therefore understand the skepticism with which we view the proposed development in Alaska. Rather than risk permanent disruption of the last great wilderness left on the continent of North America, we ask that this committee pursue legislation in favor of full wilderness designation.

Historically our people did not have to worry about saving the porcupine caribou herd. Our only worry was whether the animals would come close to our village. We now have to worry. We are involved in land claims. We have representatives of the Canadian Porcupine Caribou Management Board. We have representatives at the negotiations and the signing of the Porcupine Caribou International Agreement. We are adapting quickly, as we must, to the many issues which threaten our culture. This is not our way. It is yours.

Thank you.

[The prepared statement of Mr. Linklater follows:]

THANK-YOU MIKE, HONORABLE SENATORS, I WELCOME THIS OPPORTUNITY TO SPEAK ON THE BEHALF OF MY PEOPLE FOR A CAUSE WHICH IS SO VITALLY IMPORTANT TO OUR DAY-TO-DAY EXISTENCE.

OLD CROW IS A SMALL VILLAGE OF ABOUT 300 ABORIGINAL MEN, WOMEN, CHILDREN AND ELDERS. IT IS LOCATED WHERE THE CROW RIVER MEETS THE PORQUPINE RIVER, A SPOT CHOSEN SPECIFICALLY BECAUSE IT IS ALONG THE MIGRATION ROUTE OF THE PORQUPINE CARIBOU HERD.

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THE HARVEST IS NOT SIMPLY AN ACTIVITY WHICH INVOLVES THE HUNTER AND THE HUNTED, BUT INOLVES A NETWORK OF FAMILY, FRIENDS AND NEIGHBOURS WHO COOPERATIVELY SHARE IN THE THE WORK TO BE DONE AND THE GOODS TO BE PRODUCED.

THE SKINS OF CARIBOU CONTINUE TO BE USED TO PROVIDE THE HIGHEST QUALITY OF COLD-WEATHER CLOTHING... AND AS I AM SURE YOU CAN APPRECIATE LIFE ABOVE THE ARCTIC CIRCLE IS COLD INDEED!

WE HAVE READ U.S. GOVERNMENT REPORTS WHICH ARGUE THAT THERE IS LITTLE RISK IN THE DEVELOPMENT ON THE 1002 LANDS. AS MIKE HAS INDICATED WE HAVE GRAVE DOUBTS OVER THE INTEGRITY OF THE LEGISLATIVE ENVIROMENTAL IMPACT STATEMENT. WE ARE CONFOUNDED AS TO WHY THIS REPORT MAY CONCLUDE ON ONE HAND THAT "MAJOR" IMPACT IS EXPECTED TO THE CARIBOU AS A RESULT OF THE DEVELOPMENT WHILE ON THE OTHER THE REPORT ANTICIPATES THAT "NO APPRECIABLE POPULATION DECLINE IS EXPECTED". IN LIGHT OF THESE FACTS YOU MUST THEREFORE UNDERSTAND THE SKEPTICISM WITH WHICH WE VIEW THE PROPOSED DEVELOPMENT IN ALASKA. RATHER THAN RISK PERMANENT DISRUPTION OF THE LAST GREAT WILDERNESS LEFT ON THE CONTINENT OF NORTH AMERICA WE ASK THAT THIS COMMITEE PURSUE LEGISLATION IN FAVOR OF FULL WILDERNESS DESIGNATION.

THANK-YOU, MIKE AND MYSELF WOULD NOW BE GLAD TO ANSWER ANY QUESTIONS YOU MIGHT HAVE ARISING FROM THE COMMENTS WE HAVE MADE.

Senator WIRTH. Mr. Linklater, thank you very much.

Senator Ford?

Senator FORD. Thank you, Mr. Chairman.

Let me ask Mr. Campbell. What would happen to my soul if I voted against you? [Laughter.]

Mr. CAMPBELL. That's up to your own destiny actually.

Senator FORD. But you made a statement in your letter to the committee, and I happen to be a member of the committee. And you said that my soul would have been compromised.

Mr. CAMPBELL. If you did not——

Senator FORD. Support your position.

Mr. CAMPBELL [continuing]. Support my position.

Senator FORD. Yes.

Mr. CAMPBELL. Actually, what I believe that meant is if you went up there, or if you feel the land there itself, if you see what the land is, the soul of the land—and you could say that developing this coastal plain would not totally destroy the integral part of the whole refuge, the whole piece of ground we are talking about, then——

Senator FORD. In your opinion my soul would have been compromised.

Mr. CAMPBELL. Yes.

Senator FORD. James, John, Luke, Leviticus, Numbers, Deuteronomy is where my soul is, and I will have to make a judgment here. And I understand the passion by which you are pleading with the committee today.

And I think, Mr. Dittrick, had about the same feel for it. How many people do you usher through that area annually?

Mr. DITTRICK. Last year it was about 15.

Senator FORD. How many this year?

Mr. DITTRICK. About 15. I did two trips each year.

Senator FORD. And that's the only livelihood you have?

Mr. DITTRICK. Well, ANWR right now is where I'm doing most of my trips. I do some trips in some other areas. But the economy in Alaska isn't the greatest right now, and I am in the process of building a new business. And so, yes. That was basically my income for last year.

Senator FORD. They're not sending you monthly checks.

Tell me about the negotiations that you are having, Mr. Smith, with the Federal Government for some rights in your area. You stated in here that you are in the process of negotiating with the Federal Government to secure for all Yukon Indian people the opportunity to participate in traditional hunting. You mean you don't have it now?

Mr. SMITH. Yes, we still do have it. We are wanting to have that recognized and secured in perpetuity. We are negotiating with the government of Canada land claims. We have been negotiating at the table for the last 14 years. The issue is very complex and one of the highlights of that agreement, once we do reach it, would be that the aboriginal people of the Yukon would continue to hunt.

We have rights that are recognized by the government. They are recognized in law, but it hasn't been really defined so that everyone can really appreciate it.

Senator **Ford**. Now, is this negotiation just with Canada, or is it with the United States also?

Mr. **Smith**. No. This negotiation is with Canada. We are not advanced that far that we can negotiate with another sovereign nation.

Senator **Ford**. Well, do you have treaties with Canada and treaties with the United States?

Mr. **Smith**. Well, we live on the Canadian side.

Senator **Ford**. Oh, you live on the Canadian side. You don't live on——

Mr. **Smith**. So, we negotiate with the Canadian government. Our cousins, our family members who live on the American side negotiate with the American Government.

Senator **Ford**. Does Howard live on the Canadian side also?

Mr. **Smith**. Yes.

Senator **Ford**. How far from the border do you live?

Mr. **Linklater**. Approximately 150 miles from—the nearest Alaskan community would be Fort Yukon, Alaska, and they are closely related to us, along with the other smaller villages around there.

Senator **Ford**. How many of your people are residents of Alaska?

Mr. **Linklater**. There's a small number of people who are Alaskan citizens or benefit from Alaskan land claims. But there's not much—a small number of elderly people. But we still do keep close cultural ties with our cousins in Alaska.

Senator **Ford**. But it is diminishing, and most of it is in Canada. Is that correct?

Mr. **Linklater**. What's diminishing?

Senator **Ford**. Your relationship or your people in Alaska. You have a lot of older people and that sort of thing?

Mr. **Linklater**. Yes.

Senator **Ford**. Most activity is on the Canadian side?

Mr. **Linklater**. Yes. We still keep strong family ties with people even though some of the people that live in our community were born in Alaska—even though those people are diminishing, we still keep strong ties because of cultural values and everything. We are of the same people. We are the same people in Canada and Alaska.

Senator **Ford**. Well, Mr. Smith, let me ask you this since you're in Canada. I listened to Senator Murkowski a moment ago. He said the Canadians had drilled about 80 wells or something like that in a general area through there. And that no longer appears to be an opportunity for a find of oil reserves. And since then they have made that into a park or a wilderness, whatever it is. Do you find that those wells have diminished the caribou herd or eliminated your hunting and fishing? In how much jeopardy has your situation been placed?

Mr. **Smith**. Just briefly, the developments mentioned are the oil wells. Most of the activities are around the arctic coast there, and it's off-shore.

The other thing is that the areas in question are not the calving grounds of the porcupine caribou herd. They are involved mainly in the migratory patterns and have affected the migratory routes of the caribou.

Mr. Linklater could probably answer that question also.

Senator Ford. When you say it has changed the route, how much has it changed it? Is it 20 miles, 30 miles, 100 miles, diverted? I understand that the roads that are built up there—it was said that they would never cross that, but they do when they migrate.

I'm sorry I'm asking such detail. Just talk to me like we were sitting around the fire chewing the fat. I want to get some comment from you so I understand it a little better. I'm the one whose soul is——

Mr. Smith. Your soul is on the line.

Senator Ford [continuing]. On the table here. And I am trying to cleanse it if I can. [Laughter.]

It appears that my soul is in jeopardy though I've joined the church.

Mr. Linklater. If I might answer the question with respect to the highway and the effect it has on the herd. Our position is that because of the highway there is impact on the herd. It disrupts the migration.

Senator Ford. Has it reduced the number of caribou that would migrate?

Mr. Linklater. It hasn't reduced it.

Senator Ford. It hasn't reduced it any.

Mr. Linklater. But it has disrupted it, yes.

Senator Ford. Then when you say the wells were drilled and it changed the direction of the migration, it hasn't changed the numbers. So, it has just changed the area in which they go? How much has it changed? When they would go where the oil wells were, what is the distance from that area that they now migrate to?

Mr. Linklater. It simply diverts the migration around. But you have to understand——

Senator Ford. They get around it, and they go basically the same place that they would have migrated to originally.

Mr. Linklater. You have to understand that in our community we live in—like the closest highway, the Dempster Highway, to us is 130 miles away. So, we live in a very isolated area. Air access only. So, when you divert the migration of the herd, it affects us because it takes us even—it makes us harder for us to get the food that we require, like a simple diversion of 50 miles is quite substantial in our area because of the isolation of it.

Senator Ford. Do you know how much distance in miles the diversion has been?

Mr. Linklater. No.

Senator Ford. I'm just trying to get some idea.

The highway apparently hasn't bothered the numbers, but it has maybe created a sort of barrier. The oil wells haven't affected the number that would come across or migrate. It has changed maybe the direction. They go around it.

Thank you, Mr. Chairman.

Senator Wirth. Thank you, Senator Ford.

Senator Murkowski?

Senator Murkowski. Thank you, Mr. Chairman.

I am curious to know, gentlemen—and I am speaking to two friends from Canada, Mr. Smith and Mr. Linklater—with regard to the drilling that did occur over several years of exploration in the Canadian Arctic, which we are referring to as some 80 wells that were drilled in the general migration path of the porcupine caribou. When did the Canadian Government allow that drilling, what was the attitude of the people that you represent basically, the Yukon Indian groups, Porcupine, Old Crow? Did you object strongly to the Canadian government's proposal to initiate drilling? And what was their reaction to your concerns?

Mr. SMITH. The developments in that area deal with a very complex range of——

Senator MURKOWSKI. A very complex what?

Mr. SMITH. A complex range of activities. You are dealing with exploration. You are dealing with drilling, and you're dealing with the placing of infrastructures to provide supplies to that area.

We, over the period of time, were strenuously opposed to the development. We also participated in a lengthy hearing process dealing with the proposed building of a pipeline from the arctic coast down the MacKenzie Valley to the markets in the south.

We were successful in that we either delayed or defeated that proposal to build that pipeline. But we never were successful enough to stop the developments that had occurred, mainly some of the exploration wells that were drilled.

Senator MURKOWSKI. Now, you're pursuing land claims similar to what was pursued by the native people of Alaska. And of course, the native people of Alaska received title to their lands, and they received 40 million acres of land. I assume that your settlement is for clear title to the land. Is that correct?

Mr. SMITH. Our settlement is slightly different than what happened in Alaska. We wouldn't be asking for fee simple title to our lands.

Senator MURKOWSKI. You wouldn't be.

Mr. SMITH. No, we wouldn't. We would still retain our aboriginal title to the lands we have set aside similar to what happened in the lower 48 where we have areas of land designated as Indian reservations. But they won't be per se Indian reservations. But they would be lands held——

Senator MURKOWSKI. Let me address the question a little more narrowly.

Mr. SMITH. Okay.

Senator MURKOWSKI. Would it be your intention, if you were successful in your land claims effort and received title to aboriginal lands, that you would disallow any oil and gas exploration on your lands?

Mr. SMITH. Well, part of the title would include the subsurface, and we are also now in negotiations on the rights to oil and gas interests.

Senator MURKOWSKI. So, you're negotiating for oil and gas interests in your land claims legislation.

Mr. SMITH. Well, we want to control any developments regarding oil and gas developments.

Senator MURKOWSKI. All right. My question is whether you were successful, would you allow oil and gas exploration on these lands.

Mr. SMITH. Well, that would depend on where the area in question would be explored. If it was a sensitive calving area, we would not permit that.

Senator **Murkowski**. Did you object to the Dempster Highway construction as well when it was planned through Canada? Did it provide employment for your people and various other things? Or was there any consensus on that highway?

Mr. **Linklater**. That was a number of years ago, and there was objection from our people in particular. But as you can tell from our numbers, we have very little impact on that. And it's in the same context as we'll use the Dempster Highway and the political feeling at the time—it was the same as the ANWR situation where it is what I believe at the time the Prime Minister called "roads to resources."

We are still fighting certain activities that are happening along the highway and we are setting up legislation and other things to protect caribou and——

Senator **Murkowski**. But you have seen the highway in operation and the caribou cross the highway and the trucks go up and down. And there's not an awful lot of traffic, but there's a reasonable amount of traffic associated with the Canadian Arctic.

The last question I have for you gentlemen is I noticed in the statement that was made I believe in the full text of the CYI position, Council for Yukon Indians, the interest of our people—you stand firmly against any oil and gas development in the 1002 lands, which is in the Alaska lands. Yet, you have qualified in your statement, as far as your own lands are concerned, that's really your own business. And you will make your own decisions. But it's obviously directed at the 1002 lands in Alaska not being developed.

And you also take the position that the Canadian federal government and the Yukon Territorial Assembly are in agreement. Are you aware of the Canadian free trade agreement that was just consummated where the Canadians as a matter of one of their top priorities asked for a waiver of the prohibition against the export of north slope oil which would allow Canada to receive up to 50,000 barrels a day of north slope oil from Alaska?

Mr. **Smith**. No. We are not really aware of those details. However, we note your comments there and we have exception to that because our first priority is always to maintain the cultural integrity of our people. And if the people decide that their main interest is to continue in hunting and fishing activities, that would prevail over any decision for developments.

Senator **Murkowski**. I think it is important for the record to note with respect to the Canadian government, whatever the official position of the Canadian government is with regard to the 1002, million and a half acres proposed for exploration in Alaska, the Canadian government has insisted upon, in their trade negotiations, to have accessibility to 50,000 barrels of north slope oil. And I find a bit of an inconsistency there because obviously the oil has to come from somewhere, and it is coming from the arctic.

And the last question I have is relative to the caribou. I wonder if you could explain the extraordinary increase in the central arctic herd which is in the Prudhoe Bay herd which is now estimated to be 14,000, 15,000, and prior to the development in Prudhoe Bay it was somewhere between 3,000 and 4,000.

Mr. **Linklater**. We have some information from what Canadian biologists have studied on the porcupine caribou herd and some information about the central herd, as it's called. I understand that there is a hunting restriction on the central herd, and it is a very different herd.

We have great objection as comparing the two—comparing the central herd to the porcupine caribou herd—because as biologists will tell you, there is a very big difference in the size and also the habitat which it requires. A very large herd like the porcupine caribou herd requires great many lands. That's why we are so concerned in protecting the habitat. And that's why in our land claims we have selected lands which will do that. As the central herd—quite considerably small compared to 180,000 caribou, the latest count. So, comparing the two, it's like comparing apples and oranges in my mind.

Senator MURKOWSKI. Yes. But I think there is a justifiable comparison in the sense of a generation of activity occurring that both herds were exposed to because obviously the central arctic herd calves in the arctic area adjacent to and around—and there's activity there. And it's fair to say that the porcupine herd moves through areas of activity—the Dempster Highway—to suggest there's no activity in ANWR is incorrect. There are airplanes. There are helicopters moving around. There's the village of Kaktovik. There are the DEW-line sites.

And if you would care to comment on a study that was done by a Canadian biologist by the name of Bergerud, we would certainly appreciate you providing that for the record. And I would ask that, Mr. Chairman, if the gentlemen are so inclined, because I think it is extraordinary. He has lived with the caribou for some 26 years. And his observations are that the caribou are a very extraordinary and adaptable animal. And what happens during the movement of the porcupine herd particularly is that they split off, and the females go out to the bleak coastal plain, as far away from the foothills as they possibly can, to calve because there's basically no cover for predators out there. And the males stay in where the feed is better and basically tough out the summer.

In any event, if you would care to comment on your own observations on the validity of the Canadian biologist, it would be helpful.

I have two more brief questions——

Senator WIRTH. Without objection, that will be included in the record.

Senator MURKOWSKI [continuing]. With regard to the testimony before us. Mr. Campbell, we all deal with wilderness in degrees. And in the services you provide you fly your people in, and you fly in and your gear flies in. Is that generally correct?

Mr. CAMPBELL. That's right.

Senator MURKOWSKI. And you fly into the wilderness.

Mr. CAMPBELL. That's right.

Senator MURKOWSKI. You don't fly to the edge of the wilderness, unload everything and then go into the wilderness.

Mr. CAMPBELL. That's right.

Senator MURKOWSKI. So, you know, when you talk about pristine wilderness, it's in degrees. There's no other way practically to get into the area than flying. To pack in would be extraordinarily difficult. To take in a vehicle runs the risk of leaving an imprint. So, I guess what you're saying is that as we experience the true sense of wilderness, we do so with some qualification out of the necessity of convenience which means you have camps, you have outboard motors. You have noise. You have people.

And again, as we reflect in wilderness in Alaska—I don't know if you gentlemen have ever been to the west coast of Prince of Wales and observed the old marble quarries, the Donnelly sites, the old mines that have gone back to a wilderness. Have you ever experienced that kind of view of Alaska?

Mr. CAMPBELL. No.

Senator MURKOWSKI. Well, as you have invited me, and I have been, I think that there is a case to be made, particularly in certain areas in Alaska where the vegetation is so phenomenal that it truly does go back to a wilderness state. Now, it's true that there is a quarry there or there is a mine, but even the tailing piles that we see outside of Fairbanks given a period of time—and there's been no effort in those tailing piles for any regeneration. It has been natural, but it theoretically goes back to a wilderness. And I would certainly invite you to take a look at the area on the west coast of Prince of Wales Island if you ever have an opportunity to experience or revisit to an extraordinary area. It's very beautiful. But it has really gone back to a wilderness.

In the early 1920s, there were several towns there. There were several thousand people there in five specific town sites. And today there's absolutely nothing. The only possibility of finding a footprint is to go in and penetrate the spruce and hemlock forests, and you may find some evidence.

But I make the comment in general terms to I think reflect on a realism that I believe—you know, when you brought 15 people into your particular area, how many of them were Alaskans?

Mr. CAMPBELL. Seven.

Senator MURKOWSKI. That's pretty good. That's higher than I would expect. So, it's very unique. It's very expensive. And we would like to have more, but I'm sure even in your own mind there's a number that you wouldn't want to see any more of because then it would spoil the wilderness. So, we are going to have to presume that we can have a natural balance even though we are going to have more pressure.

But we look at an ecosystem. We look at the area described by the witnesses, and I think we have to do it within a reasonable compromise. And the fact that I would go back to is we have done a better job than any other state. We have 57 million acres of wilderness in the State of Alaska, as much as a half a dozen States put together. And when we talk about ANWR, we have 18 million acres in the area, and we are talking about allowing exploration on only a million and a half acres. Another 8 million acres are set aside in perpetuity, and another 8 million acres is in a refuge. And you know, it's a matter of balance here. And as we reflect on the fact that you folks need energy to get in there, there is a compromise.

Thank you, Mr. Chairman.

Mr. CAMPBELL. May I comment?

Senator MURKOWSKI. Sure.

Senator FORD. After that lecture, you ought to be able to.

Mr. CAMPBELL. Prince of Wales Island?

Senator MURKOWSKI. That is correct.

Mr. CAMPBELL. That is in Prince William Sound. Is that——

Senator MURKOWSKI. Oh, no.

Mr. CAMPBELL. Where is——

Senator MURKOWSKI. No, it's in southeastern Alaska.

Mr. CAMPBELL. Southeastern Alaska is a much——

Senator MURKOWSKI. Directly across from Ketchikan.

Mr. CAMPBELL. Okay. That's a much different climate——

Senator MURKOWSKI. Oh, surely.

Mr. CAMPBELL [continuing]. Than comparing this with the coastal plain for one thing. So, I can actually understand in a rain forest where you could have some sort of development and then move out. In a short period of time it can just be totally overgrown to where you couldn't see anything.

In the wildlife refuge—I mean, some people find it hard to believe that it's a desert because it rains on them quite often in the summer. But it is. It's a semiarid desert.

Senator MURKOWSKI. Sure, it is.

Mr. CAMPBELL. It gets—I don't know—somewhere around 8 inches of precipitation or something. It's a very, very fragile environment. It doesn't recover very quickly.

But to compare—just the society—you know, it is in our world or our lives and everything. We do depend on oil. I'm not saying I want to do away with oil. I mean I have to drive around and fly around. You know, our fancy tents and all our new gear today is all basically oil products. But there are many other things that can be done to curtail the use of oil—get away with the throw-away stuff. There are many things that can be done for energy purposes.

And this is the last untouched, undisturbed basically piece of ground that is not—that's what people are going there for. They're not——

Senator MURKOWSKI. Let me make one more point because we have got to move on to accommodate the Chairman.

Have you looked at the actual drill site, the only drill site in the refuge?

Mr. CAMPBELL. I've flown over it.

Senator MURKOWSKI. Have you seen the footprint of it—physically seen what remains there today?

Mr. CAMPBELL. Yes.

Senator MURKOWSKI. Can you describe it for the——

Mr. CAMPBELL. I've also seen the seismic lines which almost brought tears to my eyes the first time I saw it flying over. And you can still see these lines all across from the seismic work that was done——

Senator MURKOWSKI. I think it is fair to point out that that type of seismic work is not done anymore.

Mr. CAMPBELL. Okay.

Senator MURKOWSKI. Is that not correct?

Mr. CAMPBELL. Well, I don't know about that. But what was done is still out there.

Senator MURKOWSKI. Well, it is not done anymore, and the record should note that. But if you would care to comment on what you saw or the footprint that's remaining today on the only well——

Mr. CAMPBELL. Are you speaking of the hole?

Senator MURKOWSKI [continuing]. That was drilled in the wilderness area.

Mr. CAMPBELL. Are you speaking of—I think it is sort of called the hole or whatever.

Senator MURKOWSKI. Well, what is it?

Mr. CAMPBELL. That's what it looked like to me from the air. It was a hole.

Senator MURKOWSKI. It's my understanding—the committee has had pictures of it.

Mr. CAMPBELL. A big hole.

Senator MURKOWSKI. There's a remains of a pad that has been returned to its natural state as far as the effort of revegetation. It's a very, very small area, about 120 feet by 600 feet. And that's all that remains. There's no physical building, no pipe, nothing.

Senator CONRAD. We are going to have to——

Senator FORD. Mr. Chairman, I know they understand, and this is part of the problem here. But I want to ask one question.

Mr. Smith, how many people are involved that you are representing here today, you and your friend?

Mr. SMITH. We are representing approximately 6,000 aboriginal people.

Senator FORD. Now, a part of that question—did I understand you to say it takes an average of seven caribou per year per person or per family?

Mr. SMITH. Well, we are referring to the communities that are directly affected by the herd. There are three communities, approximately 250 to 300 people in those communities. And it takes seven caribou per family.

Senator FORD. Per family.

Jim, I don't intend to lose my soul. [Laughter.]

Mr. CAMPBELL. The key word there was "perhaps."

Senator FORD. If you don't keep a good humor in this place, you go crazy. [Laughter.]

I'm going to keep mine.

Senator CONRAD. We very much appreciate your contribution here today, your willingness to come and provide your views.

Next we will hear from our third panel: Lenny Kohm of Sonoma, California; Steve Andrews of Denver, Colorado; Mr. Dexter Perkins of Grand Forks, North Dakota; and Sally Reid, of Frazier Park, California. So, if that next panel will come forward and take a seat.

Again, we want to thank the members of the previous panel.

Mr. CAMPBELL. Thank you, Mr. Chairman. I forgot. I've got three letters also from other colleagues.

Senator CONRAD. They'll be entered into the record, without objection.[1]

Mr. CAMPBELL. Thank you.

Senator CONRAD. Senator Burdick, the senior Senator from North Dakota is here, and he would like to welcome to this gathering Mr. Perkins from North Dakota. Senator Burdick?

Senator BURDICK. Thank you, Mr. Chairman.

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[1] See Appendix II.

I would like to introduce to the committee and to others Dr. Dexter Perkins. Dr. Perkins is a professor of geology at the University of North Dakota. He is an author of many articles, books, other publications such as a dissertation on ancient rocks. He has also worked for the oil industry in Texas. He has been teaching at the University of North Dakota for the past seven years, and before that time at the University of Chicago. It's a great pleasure for me to introduce Dr. Perkins to this committee.

Dr. **Perkins**. Thank you, Senator.

Senator **Conrad**. Thank you, Senator Burdick. We have been proceeding by allowing three and a half minutes for a statement. So, if you could summarize the statements that you have brought here today. Three and a half minutes—roughly that. And we want you to know that your full statement will be made part of the record. That will preserve time for questions. So, if we can proceed with Mr. Kohm.

STATEMENT OF LENNY KOHM, SONOMA, CA

Mr. **Kohm**. Thank you.

My name is Lenny Kohm, and I'm a professional photographer. And I was fortunate to be able to go up to the refuge this summer. I only spent three days there, but I can tell you, Senator Murkowski, you are very lucky to have it.

Senator **Murkowski**. I certainly agree.

Mr. **Kohm**. And basically my concern is with the preservation of the species—my own.

And I was fortunate enough also to go to the Yukon Territory and spend 10 days in Old Crow.

My basic message is these people have been the guardian caretakers of those lands for 30,000 years. That is more time than I can think about. And it would seem to me that if we want to know how to treat that land, and what should happen with that land, these are the people we should listen to because they certainly have the most experience.

My experiences in Old Crow I'll never forget. The friends I made there and the things I learned. I wish I could share them all with you. In three and a half minutes it's kind of hard.

But I would hope that you would bring more people from Old Crow and the surrounding communities, both in Alaska and the Yukon Territory and the Northwest Territories and Canada, and listen to what they have to say because I think they really know.

That's basically all I have to say. Thank you.

[The prepared statement of Mr. Kohm follows:]

My name is Lenny Kohm. In August of this year, I went to the Arctic National Wildlife Refuge on a photographic assignment. I spent 3 days photographing the pristine and irreplaceable wonders of the Artic National Wildlife Refuge and the contrasting ugliness the petroleum industry has created on the Prudhoe Bay side of the north slope.

I have come to Washington to speak to you about the Gwitchin Nation, a 30,000 year old civilization of Native North Americans whose culture would be at risk if the proposed development of the 1002 lands in the Refuge takes place. The area in question is the core calving grounds of the Porcupine Caribou Herd, the primary source of food for the Gwitchin people. In addition, the proposed developement would seriously damage our last protected area on the United States Arctic coastline.

As I previously stated, my original purpose in going to Arctic National Wildlife Refuge was a photographic assignment. In no way did I expect to become passionately involved with a cause. But after spending 10 days in the Gwitchin village of Old Crow, Yukon territory, Canada , (located on the Porcupine River about 150 miles east of Fort Yukon Alaska and 150 miles south of Canada's arctic coast), I learned, indeed experienced, what it might be like to lose the food source of 85% of one's diet, and therefore, see a 30,000 year old culture vanish.

The Gwitchin tradition dictates that all members share the land and the responsibility for it. They share the bounty with the wild life.

Animals are not thought of merely as pieces of meat but as Norman Kassi, Member of the Yukon Territory Legislative Assembly representing Old Crow said, "The caribou are our relatives. We must take care of them. We must take care of the land and everything on it."

The Gwitchin people of Old Crow maintain a subsistance economy based on the availability of an adequate food supply. The diet of the average citizen of Old Crow consists of 85% caribou meat and the balance is made up of other animal meats, fish, berries, and supplies trucked from Whitehorse to Eagle Plains, Yukon Territory, where it is flown in to Old Crow once a week. The effect on these people by just a slight change in the present status of the Porcupine Caribou Herd would cause them great hardships, in addition to the hardships they constantly endure now due to the rigors of living in such a primitive wilderness.

I cannot understand why our government would even consider the possibility of damaging our last protected area on the Arctic coastline, and thus put at risk the caribou herd and the culture of the Gwitchin people. We are once again at an all-too-familiar crossroads. We must decide whether industrial development takes precedence over the rights and needs of a native people. Why are we once again teetering on the brink of making an potentially tragic and irreversible decision? Have we not learned what results when we strip a people of their food, their culture, their entire way of life?

We should take advantage of the wisdom of these people who have been caretakers of the land for more than 30,000 years and take heed of their opinions about this proposed development. Clearly it is their lives that are at stake.

Senator **Conrad**. Thank you, Mr. Kohm.

Next we will hear from Steve Andrews of Denver, Colorado. Steve?

STATEMENT OF STEVE ANDREWS, DENVER, CO

Mr. **Andrews**. Mr. Chairman, thank you for the opportunity to appear before you and your committee. I'm a writer and consultant on energy issues specifically energy efficient housing and transportation issues, and have worked on television documentaries on the energy field. But I have also been a wilderness instructor and program director for the Colorado Outward Bound School. So, I have a long history of spending time in the mountains. I expect I have lived four or five years out of a backpack with a sleeping bag.

I have spent some time in the ANWR, part of a 45 day expedition that was done in the three ecosystems. And I am here to tell you why I think it should be left as a wilderness area. I have got three key points to make.

First, I think of the wilderness areas that I have been fortunate enough to travel in both in terms of personal experience and professionally working as something of a guide, this is the most unique I've ever been in. I've been in South America, in New Zealand. I have spent time in the wilderness areas in the west. In none of them have I ever been able to be someplace where I couldn't get to a road in about two or at most three days—perhaps the canyons of Utah.

When I was out in the ANWR in the depths of it on the upper reaches of the Kongakut, I expect that we were something between 20 and 30 days from the nearest habitation. That is a unique wilderness area. Senator Murkowski said that it is an expensive one to visit because it is so unique and so large. I spent $1,100, which I reckon is about what it would have cost me to spend two weeks in Aspen which is about four hours from where I live. So, I don't necessarily think it's a matter of dollars. It's a matter of what you are there to visit, what you want to see.

And the most memorable personal experience I had in the wilderness was, if you will pardon the expression, talking with the wolves. It had been on my lifetime list to see and hear a wolf in the wild. And I saw one. And several of us—there were five of us on our expedition team. And we were laughing and rolling on the ground. We had seen. It was great. We had done it. And then the next day we saw a pack of wolves. And after 20 minutes of watching them, on a hunch, on a bet I howled at them and they howled back for some 20 minutes echoing in the Hula Hula River Valley. It's an experience I'll never forget. And I wouldn't trade it either.

My concern is that—my first one is that the wilderness up there is unique.

My second point is that development and limited exploration will, I believe, be similar to taking the top off of a bottle of champagne to uncorking it yesterday and drinking it today. You still get some flavor from it. It will quench some thirst, but it has lost its essence. To borrow the words of Jim Campbell, it has lost its soul, what was really special about it.

I encourage you to realize that the visual intrusions in that large area along the coastline have a much greater impact than the small area that they will occupy. If your children in 20 years are coasting down the Kongakut River and they come up only six feet to the riverbank and they look, will they see musk oxen the way I did when we were there? Or will they see 10 miles or even 20 miles in the distance an oil rig platform? That will pop the essence of that. That will, I think, disturb the wilderness experience that is there for people for generations to come. So, that really worries me.

I would like to end with a comment on energy issues. I think that we do have compromises, but they are actually alternatives. They're not compromising that area. They are alternatives like more energy efficient automobiles. If you increase the fleet efficiency of new cars by just three miles per gallon, you will replace the need for the ANWR development over the next few decades.

Thank you very much for your time.

[The prepared statement of Mr. Andrews follows:]

PREPARED STATEMENT
OF STEVE ANDREWS
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

October 22, 1987

Mr. Chairman, I am Steve Andrews, a citizen of Colorado and a consultant and writer about residential energy issues. I was part of a small expedition that spent 45 days traveling in the Arctic National Wildlife Refuge, and I'm here testifying on behalf of the Alaska Coalition to tell you why I think the ANWR should be designated as a wilderness area.

I have three key points to make:

1) The ANWR is a true wilderness, as untouched as anything I or my adventure-minded team members have ever seen;

2) No matter how careful the efforts of the oil companies and no matter how much they have learned to minimize the environmental impact of their activities, I believe the proposed exploration for and development of oil resources in and along the coastal plain area will damage the essence of this unique wilderness area;

3) It is clear to me that while drilling in the ANWR would provide a welcome boost to the oil industry, it would do little to solve our energy problems 15 years from now and it would do virtually nothing to solve our our longer term energy problem, which is that we will eventually run out of domestic oil.

Unique Wilderness

A visit to the Artic National Wildlife Refuge offers a once-in-a-lifetime adventure. For me, it was the most powerful wilderness experience I've ever had, and I've spent over three years living out of a backpack in U.S. wilderness areas:

In late July of 1982, I was one of a five-man team that flew to Kaktovik for a trip that several locals said ranked as the most adventurous undertaken in recent memory. During the 45-day adventure, our group climbed glacier-covered Mt. Chamberlin, traveled 180 miles cross-country in four separate major drainages, floated 70 miles down the Kongakut river, and paddled along the Beaufort Lagoon and out into the Beaufort Sea. There is no other place in the United States I am aware of where you can find ANWR's three distinct eco-systems—alpine, arctic plains, and arctic coastline—so close together and of such pristine quality. Our's was an awe-inspiring trip in terrain that felt as untouched as the old west must have appeared to the earliest explorers two hundred years ago.

In our experience, we found that ANWR's wildlife was indeed wild. Of the 8 encounters our group had with grizzlies, we got the impression that some of them had never seen man before. Old Ursus Arctos—the world's biggest carnivore, yet an animal that looks like a hamster from the air—would stand up, look at us quizzically and sniff around until we got a little worried and started blowing our whistles or banging pots and pans. Seals along the Beaufort Sea played tag with the kayaks but didn't like being approached out of the water. Herds of caribou both large and small would run at our approach, though they often circled back for a second smell. Several moose were concerned at our obvious approach across the tundra, but they seemed quite aware that they were bigger than we were. Wolves that we occasionally startled along the way would bolt and run until they were at a safe distance, then fix us with a long stare before loping off.

Seeing and hearing a wolf in the wild had been on my lifetime list of goals. It is impossible to describe on paper how thrilling it was to see our first wolf in ANWR—jet black, gleaming eyes, sharp face, and at a distance of about 100 feet. We whooped it up and laughed and shook hands while watching the wolf run for several miles across the treeless tundra before it crested a ridge. Days later we managed to sneak up on a group of three adult wolves and three pups playing in the sun on the other side of the broad Hulahula River. After watching them for 20 minutes, I howled out to them. We were flabbergasted when they howled back for half an hour. They were magnificent, echoing up and down the Hulahula, as wonderful to me as Beethoven ever sounded in any concert hall.

For those who fish, ANWR is the Promised Land. Team member Ted Kerasote, a columnist and feature write for Sports Afield magazine, called ANWR's Arctic Charthe best fighting fresh-water fish he had ever caught.

As a former wilderness instructor and program director for the Colorado Outward Bound School, I've been fortunate to work and travel in many wild and scenic places in the U.S. and around the world. I've climbed in the New Zealand Alps, staggered up 23,000-foot Aconcagua in Argentina, lead expeditions in Ecuador, backpacked in most ranges of the Colorado Rockies, climbed in Wyoming, and explored remote canyons in Utah. Only in the Canyons of Utah have I ever found myself out where it might take longer than two days to reach a road. Yet in the world of the ANWR tundra, our team was at one point a 20-day walk from the nearest town. Looking at the map, you might doubt that figure, but if you have ever staggered along in the spongy bog that is the tundra, you would accept our estimate of how remote the area feels and how vast it actually is to a person on foot.

This is a truly special place, a crown jewel, the only area like it in the United States. All our team members agreed that no designated wilderness area in the lower 48 states could match the truly wild state of the Arctic National Wildlife Refuge. It must be preserved as wilderness before the opportunity is lost.

The Damage of Development in the Wilderness

If oil development proceeds as planned, I believe the Arctic Refuge will be like a bottle of champagne or a can of pop that someone opened yesterday. Yes, you can still drink it today, and if you didn't know what to expect or what you were missing, it would quench your thirst. But the pizzazz, the essence that made the refuge special would be gone.

Imagine your children, in the year 2007, on a two-week trip that took in some of the highlights we saw. While taking a break from paddling down the Kongakut and across the artic plain, assume they stepped out of their boats to and scrambled up the six-foot embankment to warm up their frozen feet. Would they see a few muskoxen as we did, or an eagle trying to steal a piece of meat from carrion being guarded by an angry bear, or maybe hundreds of snow geese flying in V-formations just 50 feet overhead? Or would their eyes be drawn towards plumes of dust from a truck traveling down a gravel road 2-3 miles away, with no sign of wildlife in the vicinity.

Imagine your children then paddled all the way down to the arctic coastline. Would they be marveling at the stark shapes of the floating icebergs bobbing eerily in the fog? Or gasping in amazement at the size of polar bear tracks in the sand? Yet how remote would they feel if the fog lifted and they saw a 100-foot-high drilling rig some 10 miles farther along the coast?

On January 30, 1872, on the subject of the proposed Yellowstone Park, California Senator Cornelius Cole told the Senate "I do not see the reason or propriety of setting apart a large tract of...the U.S. for a public park. There is abundance of public park ground in the Rocky Mountains that will never be occupied. It is all one great park, and never can be anything else."

From today's vantage point, it's easy to Monday-morning quarterback Senator Cole. The Rocky Mountains are criss-crossed with roads and spotted with mines, logging, ski slopes, ranches and many towns. Denver is a nice place to live if you can tolerate the air pollution, and there are still some relatively primitive areas in the mountains. But the Rockies are hardly the "great park" Senator Cole believed they always would remain.

What will future generations think of our deliberations and subsequent decisions about ANWR in 2007, just 20 years from now? If oil development proceeds, by 2007 we would know the answers to our nagging questions about the Porcupine caribou herd. We would know if one of the last great migratory herds of ungulates in the world was still thriving.

Ken Whitten, Alaska Department of Fish and Game has pointed out that some of the proposed roads and pipelines may prove to be benign when considered individually. But connected into an interlocking web of arctic industrial development and transportation corridors, they could seriously affect fish and wildlife along the arctic plain. At a minimum, as my team member Ted Kerasote has lamented, the roads, pipelines and large facilities would be visual intrusions into the largest undisturbed artic ecosystem in the country. The champagne would be flat.

Solving or Avoiding Our Energy Problems?

The key energy issue relating to ANWR oil is straightforward: our nation's oil production is in a state of inevitable and gradual decline, so we must develop energy alternatives. Why not focus on developing alternatives to oil before we tear up the northeast slope of Alaska rather than afterwards?

Short-term low oil prices are masking the fact that our long-term national energy problems are quite severe, especially our transportation sector's 95-percent reliance on oil. Transportation needs already account for two-thirds of our total oil consumption, more than our total domestic production. Despite tremendous oil price increases between 1973 and 1981, our domestic production of oil has been declining since 1970. When consumption of our domestic oil supply is illustrated in a bell-shaped curve, we are clearly on the downhill side of the curve [see attachment]. We can already sense the end of what may someday be dubbed the Oil Age.

The 19-percent chance of finding economically recoverable oil in the refuge is a bit better than buying lottery tickets, but not much better. Even if economical oil was found, oil from ANWR would make a smaller dent in our national energy problem than a few of the other energy options available to us. The Department of the Interior's own 1002 report admits oil from the Arctic Refuge would supply only 4 percent of total U.S. demand. Developing ANWR oil would undoubtedly prove to make no more sense than offering the very last big bottle of gin on the shelf to an alcoholic who is slowly perceiving the nature of his dependency problem.

There is an additional issue raised by the prospect of oil exploration in ANWR: how much "net energy" and net dollars will result from the mammouth exploration and extraction effort? Our economy runs on net energy: the energy left over after the energy used during exploration, extraction, transportation, refining, delivery and environmental mitigation. In Alaska, the energy and dollar costs of net energy production are extremely high. As Chevron recently pointed out in their 1987 "World Energy Outlook," the cost of discovering a barrel of new oil in the U.S. is higher than the cost of a barrel currently being consumed, thanks to OPEC price manipulation. Continued OPEC price controls may make ANWR oil noncompetitive for years to come.

The only effect of ANWR oil drilling will be to divert our attention from the reality that we can't "produce" our way back to the days of cheap, abundant, domestic oil. That era is gone. At present, we lack a coherent national energy policy to aid us in addressing our long-term energy needs. We need to fomulate a well-rounded energy policy to help us move beyond our heavy economic reliance on diminishing non-renewable resources.

To "tide us over" during our development of alternative resources, a much better approach than developing ANWR oil is mandating a new-car fleet that averages 40+ miles-per-gallon by year 1997 as opposed to today's relaxed standard of 26. I realize this step would be mildly unpopular with the public and very unpopular in Detroit--it would require considerable political willpower--but it undoubtedly would be more popular than waging war in the Persian Gulf. Even a 30 miles-per-gallon figure would achieve energy savings equal to projected ANWR production. Energy efficiency is a sure-fired bet, not a lottery-type wager. As outlined in this year's "Energy Security" report to President Reagan, improvements in energy efficiency have achieved results "to a degree that surprised even the optimists."

Mr. Chairman, thank you very much for providing me with this opportunity to present both my personal experience and my professional opinion. I hope that at the conclusion of these deliberations, your committee will keep the long-term interests of the nation in mind.

BEYOND OIL

Figure 2–11a. Theoretical Curve Projecting U.S. Oil Production, Drawn by Hubbert in 1956

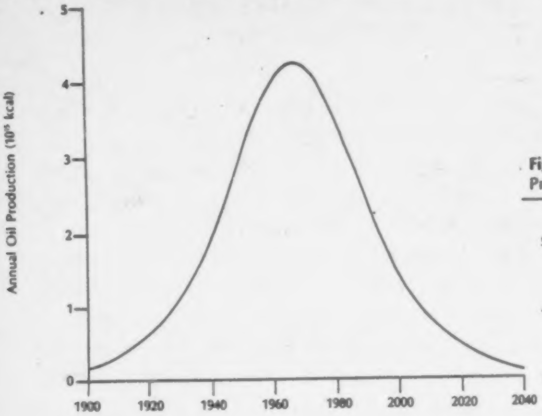
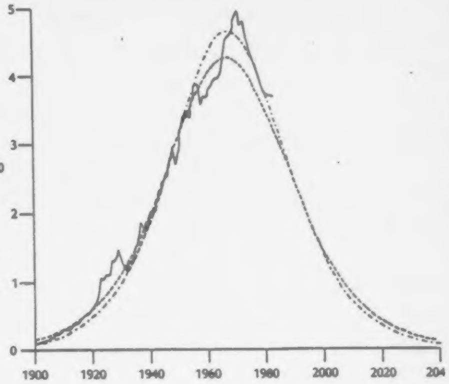
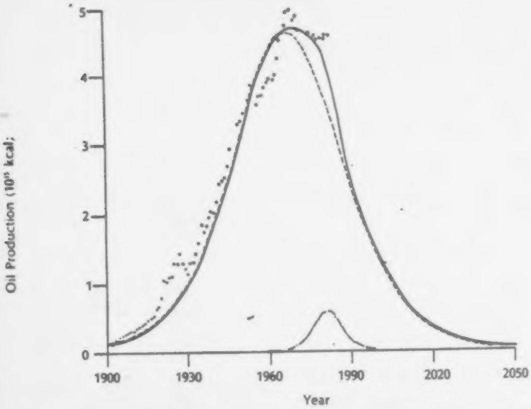


Figure 2–11b. Comparison of Hubbert Curve to Actu
Production



BEYOND OIL

Figure 2–12. Hubbert Curve for Oil Production in the Lower Forty-eight States, in Alaska, and the Sum



Sources: U.S. Department of Commerce, Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970* (Washington D.C.: USGPO, 1975); U.S. Department of Energy, *Monthly Energy Review* (Washington D.C.: DOE, various years).

Note: Dotted line is lower forty-eight states; dashed dotted line is Alaska; and solid line is sum. Dots represent actual production.

Senator **Conrad**. Thank you. We appreciate your testimony.

And now we will hear from Mr. Dexter Perkins of Grand Forks, North Dakota. Welcome, Dexter.

STATEMENT OF DR. DEXTER PERKINS, PROFESSOR OF GEOLOGY, UNIVERSITY OF NORTH DAKOTA

Dr. **Perkins**. Thank you, Kent.

My name is Dexter Perkins, and I'm a professor of geology at the University of North Dakota. I have worked professionally as a geologist in the oil industry for a brief period of time and also with some mining companies. Most of my work in the last 10 years has been conducted in the northern and central part of Canada.

I have come here to testify today because I am greatly concerned both as a geologist and a conservationist that oil and gas development is just an unacceptable thing for the 1002 area. As the Bismarck Tribune said in a recent editorial, which I have attached to my testimony, "the choice between a 20 percent chance of finding oil and a 100 percent certainty of causing irreversible environmental change should be easy." And yet, here we are today. We are debating the issue.

After returning from a recent trip to ANWR, one congressional staff member told me that it reminded him in many ways of western North Dakota, which shouldn't be too surprising. Both areas have undergone a fairly similar geological history in the recent past. But it is this very similarity to western North Dakota that brings me here today because I've been to western North Dakota and I've seen the impacts of oil and gas development.

The Little Missouri National Grasslands in western North Dakota used to amount to more than a million acres of wilderness, pristine, undisturbed grasslands, the only area of its sort in the country. If you go out there now, you find roads, drilling pads, pits, spills, pumpers, flares, derricks, ditches and all sorts of other things scattered over the area. In fact, in all the years that I've hiked and traveled out there, I can't recall any area where I wasn't within sight of some remnant of oil and gas exploration or development. Even in reclaimed areas, areas which are test reclamation areas and supposed to be done perfectly, you can still see the signs.

I oppose any exploration or development in ANWR because once the gate is open, you can't stop or adequately protect the area. The Little Missouri National Grasslands are a depressing case study. We now have roughly 34,000 acres left of the original 1,200,000 acres that were there less than 15 years ago. Due to oil and gas development, we have been losing 30,000 acres a year for the last 15 years. There is no reason in my mind why this wouldn't happen in Alaska.

This impact occurred even though the Forest Service proposed as part of their land management plans in the mid-1970s to protect the pristine character of the Little Missouri Grasslands. However, once development began, construction and disturbances associated with exploration skyrocketed. In fact, the Custer Forest supervisor in a letter of 1981 said, "Change I have found, does not always come about as a result of a plan or legal document. As an example, the development of energy resources, such as coal, gas, oil, is about to pop the seams of our 1974 and 1975 management plan on the Little Missouri Grasslands."

Drawing on my experience with the grasslands, I do not believe that even limited development is a viable option.

It is clear that, unless all estimates are way off, oil and gas development in the 1002 area will not contribute significantly to our national energy demands. The Interior Department estimates are that there is a 20 percent chance of recoverable oil and that even if it is recoverable, there is only about a 40 percent chance of there being something on the order of 3 billion barrels of oil there. It's a small amount.

Our present energy policy, based upon draining America first, just doesn't make sense. If the shortsightedness of our present energy policy is clear, it is equally clear that the Arctic National Wildlife Refuge represents a tremendous national treasure. We have heard very eloquent testimony from a handful of people this morning, and they have described it much better than I can.

If the 1002 area was not designated wilderness, irreparable harm could result from even limited oil development. For a single exploratory well, roads, drilling pads, water, pipelines, gravel, many, many things are needed.

And I wish to digress for a minute and just say the issue here is not just one herd of caribou as we seemed to have talked a lot about this morning. The issue is many animals. The issue is many small sub-ecosystems all in one large area. The issue is ANWR. It is not just caribou.

Mr. Chairman and members of the committee, you have a decision before you. Do you want to sacrifice what has been called America's Serengeti knowing that the odds are overwhelming that substantial oil deposits just do not exist there? The decision should be easy. To quote the Bismarck Tribune again, "The United States has a plethora of better options than plunging into one of the last refuges of polar bears and muskoxen to improve its oil supply. There is virtually no wilderness left in America. We shouldn't squander what is left as we do with our oil."

And to close, I would like to quote the Grand Forks Herald. "Let the Arctic refuge be for wildlife, not for wildcat drillers."

Thank you.

[The prepared statement of Dr. Perkins follows:]

STATEMENT OF DEXTER PERKINS
CONCERNING THE ARCTIC NATIONAL WILDLIFE REFUGE

BEFORE THE

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

October 22, 1987

My name is Dexter Perkins and I'm a professor at the University of North Dakota in Grand Forks, North Dakota. Thank you for this opportunity to testify. I'm a geologist, having earned both a Masters and a Doctoral degree at the University of Michigan. I have been involved in geochemical investigations of the precambrian rocks in central and northern Canada for the last eight years, and I have worked for a brief period of time for an oil company in Texas.

I have come to testify today because I am greatly concerned, both as a geologist and a conservationist, that oil and gas development poses an unacceptable threat to the coastal plain of the Arctic National Wildlife Refuge. As the Bismarck Tribune said in a recent editorial which I have attached to my testimony, "the choice between a 20 percent chance of (finding oil) and a 100 percent certainty of causing irreversible environmental change should be easy." Yet, here we are today, debating the issue despite the facts available.

After returning from a recent trip to ANWR, one congressional staff member told me that it reminded him in some ways of western North Dakota. This is not a coincidence, as both areas have had a similar geological history. It is this very fact that disturbs me since I hope that the problems of western North Dakota do not befall ANWR. The Little Missouri National Grasslands of western North Dakota contain substantial oil and gas, and the impacts of development are there for anyone to see. Roads, drilling pads, pits, spills, pumpers, flares, derricks and ditches are evident in over 90% of the grasslands and the natural beauty and quality of those areas have been eliminated. Even in areas that have been reclaimed, scars from oil and gas activities are obvious.

I oppose any exploration or development in the ANWR because once the gate is open, you can't stop, or adequately protect the area, from the destructive forces of oil and gas activities. The Little Missouri Grasslands provide a depressing case study. In the early 1970s, 550,000 acres of defacto wilderness existed. Today, all but a miniscule 34,000 acres is committed to development. Due to oil and gas development, the defacto wilderness on the Little Missouri National Grasslands has melted away at a rate of almost 30,000 acres per year for the last fifteen years.

This impact occurred even though the Forest Fervice proposed, as part of their land management plans in the mid seventies to protect the pristine character of the majority of these lands. However, once development began, construction disturbances associated with exploration and development skyrocketed. In fact, the Custer Forest Supervisor in a letter on May 20, 1981 admitted that:

"Change I have found, does not always come about as a result of a plan or legal document. As an example, the development of energy resources, such as coal, gas, oil, is about to pop the seams of our 1974 and 1975 maangement plan on the Little Missouri Grassland."

Drawing on my experience with the Little Missouri National Grasslands, I do not believe limited development is a viable option.

I'd like to now turn my attention from the lessons to be learned in North Dakota to the situation in the Alaska.

Alaska's arctic coastline is just over 1,100 miles long. All but 125 miles of the coastline -- those in the 1002 area -- are open to oil and gas development. Other areas in Alaska including the National Petroleum Reserve, the Milne Point Field, the Endicott area and the West Sak field contain substantial proven oil and gas reserves. Offshore development in the Beaufort Sea is also leased and open for development. In total there are over 55 million acres available to the oil and gas industry--many with known petroleum deposits. The 1002 area amounts to less than 3 percent of this acreage, and about 10 per cent of Alaska's north coast. It's a small area, 125 by 25 miles, with a correspondingly small potential amount of oil and gas.

The Interior Department's 1002 Report estimated a mean of 3.2 billion barrels of recoverable oil in the coastal plain. The report went on however, to estimate that the chance of there being economically recoverable oil at all is only about 19 percent, and that if oil is found there is only a 43 percent chance that it would total 3.2 billion barrels.

By comparison, the Prudhoe Bay area is known to contain 9.6 billion barrels of economically recoverable oil. The Interior Department's report estimated a 1 percent chance that such an amount could be found in the 1002 area.

Although there is an 81 percent chance that no economical oil will be found, let's consider for a moment what it would mean if we could take 3.2 billion barrels of oil out from under the coastal plain. Estimates are that the development would last for 30 years, which amounts to about 106 million barrels per year. Yet, the United States consumes 5.5 billion barrels of oil per year, so the contribution from the 1002 area would amount to a paltry 1.9 percent of the nation's demand.

If we use a "risked mean" estimate, that is take into account the odds that some geologically promising prospects will come up dry, the expected amount of oil is 0.6 billion barrels. We could save that amount of oil by increasing the fuel efficiency of our automobiles by 0.25 miles per gallon.

Thus, it is clear that unless all the estimates are way off, oil and gas development in the 1002 area will not contribute significantly to our national energy demands. If our country is truly striving for energy independence we must establish a strong and coherent energy policy. Our present policy, based upon "draining America first", just doesn't make sense if we are looking to the future. We must concentrate on alternative energy sources, conservation, and perhaps enhanced oil recovery.

If the shortsightedness of our present energy policy is clear, it is equally clear that the Arctic National Wildlife Refuge (including the coastal plain) represents a tremendous national treasure. Stretching from the boreal forest of interior Alaska northward across the Brooks Range to coastal tundra and the Beaufort Sea, the refuge is the home to plentiful and varied wildlife. It is the home to large populations of grizzly and polar bear, muskox, Dall sheep, wolf, wolverine and caribou, as well as a myriad of smaller animals and waterfowl. This area, which the United States Fish and Wildlife Service described as "the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America," should not be squandered for some oil that may not be there. To open it up oil and gas development would be like tearing down the Louvre to make a trailer park because of a housing shortage. It must be protected, and to insure its protection it should be designated Wilderness as is the rest of the refuge.

If the 1002 area was not designated Wilderness, irreparable harm would result from even limited oil development. For a single exploratory well, 15 million gallons of water would be needed. Gravel and other raw materials for roads and platforms would be required. Bridges, pipelines, housing and roads would be built. Drilling fluids and other wastes would need disposal.

The Fish and Wildlife Service has reported that oil exploration and development would cause irreparable damage to wildlife habitat, and has raised questions about the impacts of air-pollution on short- and long-term food supplies for foraging animals. Estimates are that as many as 72,000 caribou, 162,000 snow geese and hundreds of muskoxen would be lost. Marked declines in grizzly, wolf and polar bear populations are also anticipated.

The Prudhoe Bay development has been touted as the most advanced and high-tech facility of its sort. Yet, in the 15 years that activity has been taking place, there has been significant environmental decline.

Drilling wastes have leaked or sprayed across the tundra--in at least one case resulting in criminal convictions of company owners. Surface waters have been contaminated. Declines in productivity and diversity of lacustrine life have been monitored, as have incredible decreases in wolf and grizzly populations. Oil spills, too, have been commonplace. 521 were reported in 1985 alone. Five sites are being evaluated as potential Superfund sites.

The Environmental Protection Agency has expressed concerns about nitrogen oxide emissions which can cause acidification of the tundra. ARCO has estimated that 75,000 tons of nitrogen oxides are released into the air in a year--comparable to most major urban areas in the United States, and over three times what is emitted here in Washington, DC.

Within the 1002 area itself, oil exploration has already left its mark. Cat tracks remain as evidence of two seasons of seismic exploration and can be seen from the air as a 3 by 6 mile grid across the plain. In particularly fragile areas deep ruts remain from the first year's exploration.

Mr. Chairman and members of the committee you have a decision before you. Do you want to sacrifice "America's Serengeti" knowing that the odds are overwhelming that the sacrifice will be in vain? The decision should be easy. To quote the Bismarck Tribune again, "the United States has a plethora of better options than plunging into one of the last refuges of polar bears and muskoxen to improve its oil supply. There is virtually no Wilderness left in America. We shouldn't squander what's left as we do with our oil."

Thank you for your time today.

GRAND FORKS HERALD

April 23, 1987

Let the refuge be a refuge

By what definition of refuge, one wonders, can Interior Secretary Donald Hodel be thinking of when he favors oil development in one of the few coastal wilderness areas that's been placed off limits to industry in Alaska.

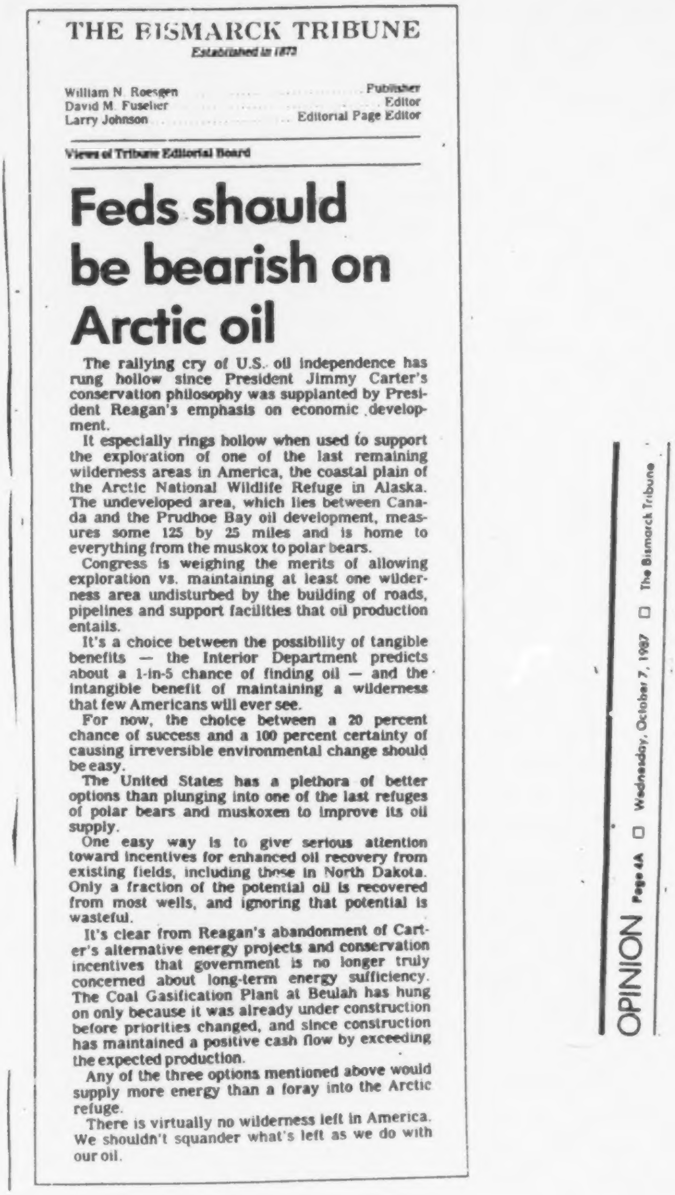
A refuge means shelter and protection from danger or difficulty. We've created such special, national places to ensure that wildlife have *wild* places to live, and that this will nurture the soul of the nation, and the understanding of its environment.

There are not many refuges, all told. In the event of an emergency, a critical shortage of energy, the nation may have no choice but to look at minerals, such as oil, that may lie beneath wildlife refuges. There's no such emergency; abundant, affordable fuel and the idled drilling rigs across the United States attest to that. Neither America nor the world is so desperate for oil that we need to raid our frozen assets, the wildlife and wild beauty of the North.

Let the Arctic refuge be for wildlife, not wildcat drillers.

Steve Schmidt
for the editorial board

Lee Hulteng, staff artist



THE BISMARCK TRIBUNE
Established in 1873

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Larry Johnson .... Editorial Page Editor

Views of Tribune Editorial Board

Feds should be bearish on Arctic oil

The rallying cry of U.S. oil independence has rung hollow since President Jimmy Carter's conservation philosophy was supplanted by President Reagan's emphasis on economic development.

It especially rings hollow when used to support the exploration of one of the last remaining wilderness areas in America, the coastal plain of the Arctic National Wildlife Refuge in Alaska. The undeveloped area, which lies between Canada and the Prudhoe Bay oil development, measures some 125 by 25 miles and is home to everything from the muskox to polar bears.

Congress is weighing the merits of allowing exploration vs. maintaining at least one wilderness area undisturbed by the building of roads, pipelines and support facilities that oil production entails.

It's a choice between the possibility of tangible benefits — the Interior Department predicts about a 1-in-5 chance of finding oil — and the intangible benefit of maintaining a wilderness that few Americans will ever see.

For now, the choice between a 20 percent chance of success and a 100 percent certainty of causing irreversible environmental change should be easy.

The United States has a plethora of better options than plunging into one of the last refuges of polar bears and muskoxen to improve its oil supply.

One easy way is to give serious attention toward incentives for enhanced oil recovery from existing fields, including those in North Dakota. Only a fraction of the potential oil is recovered from most wells, and ignoring that potential is wasteful.

It's clear from Reagan's abandonment of Carter's alternative energy projects and conservation incentives that government is no longer truly concerned about long-term energy sufficiency. The Coal Gasification Plant at Beulah has hung on only because it was already under construction before priorities changed, and since construction has maintained a positive cash flow by exceeding the expected production.

Any of the three options mentioned above would supply more energy than a foray into the Arctic refuge.

There is virtually no wilderness left in America. We shouldn't squander what's left as we do with our oil.

OPINION Page 4A ☐ Wednesday, October 7, 1987 ☐ The Bismarck Tribune

Senator **Conrad**. Thank you, Dr. Perkins.

Next we will hear from Sally Reid of Frazier Park, California. Sally.

STATEMENT OF SALLY M. REID, VICE PRESIDENT, SIERRA CLUB, FRAZIER PARK, CA

Ms. **Reid**. Good morning. Thank you for having us here, Mr. Chairman and members of the committee.

I am Vice President of the Sierra Club and a member of the club's Alaska Task Force.

I have spent a lot of time in Alaska not all on arctic plain. I have been to Glacier Bay and to Katmai National Monument. I've walked across the ash-filled valley there, the Valley of 10,000 Smokes. I have been on the Ambler River. I have spent a lot of time on the Kenai Peninsula hiking and canoeing. I've spent a week on the Kobuk Sand Dunes walking across them. And I've spent a couple of weeks on the Arctic National Wildlife Refuge.

And it is that particular trip that is most relevant here except that the other places I've been, including southeast Alaska and going across the Chilkat Trail and so forth, are relevant because with this much experience in the State of Alaska, I've never seen anything remotely similar to the arctic wildlife coastal plain. I understand there are areas that are similar, but they have all been set aside. There are 900 miles of similar areas on the north slope going down to the Arctic Ocean. That all has been set aside for military reserves and for oil drilling. And it seems to those of us who are appearing before you today that the 100 miles that is being asked to be preserved for its unique kinds of resources are very little to be calling your attention to and asking for your support for.

When we fought for the ANILCA legislation we had to preserve the 57,000 acres of wilderness that Mr. Murkowski was referring to over the objections of the entire Alaska delegation. So, it wasn't exactly an easy battle to win.

There were a lot of conflicting interests that we made compromise with at that time, and one of them was putting off a decision on the 1002 area. I think that was one of a number of mistakes that were made. It should have been included as wilderness at that time, and there wouldn't be the problems that we are having today.

We have to ask what we need the oil for. In the absence of an energy plan in the United States, it is hard to decide that we need this oil for automobiles that are getting less mileage, that we need the oil to help build freeways. I think that all of the people—and I see that orange light. This is not a 5-minute period. It was supposed to have been. But——

Senator **Conrad**. Well, I'll tell you. You can just take the 5 minutes.

Ms. **Reid**. OK.

Senator **Conrad**. Don't get too hung up on these lights.

I'm not going to.

Ms. **Reid**. Well, I try to do what I'm asked to do.

I am very impressed with the idea that Senator Roth had in his introduction of a bill yesterday having to do with this area, the

Senate Bill 1804, in which he asks for an international wilderness across the coastal plain from the part that is in the United States over to the MacKenzie River in Alaska. I think we need to have our attention drawn to bioregions much more, and we need to have our preservation of areas looking at bioregions rather than at national boundaries. We have the same, similar kind of situation in the Stikine River where there is a beautiful gorge that needs protection in Canada, and we already have a wilderness in the United States at the mouth of the river and so forth. There are a lot of those kinds of situations that we have, including acid rain which we share with Canada. They're not all that happy about that.

When you look at what has been done at Prudhoe Bay, including the latest assault is the fact that there is a cruise line going up there now and introducing people from the advantage of a bus. I think that the idea of that kind of visitation coming to the Arctic Wildlife Refuge is something that is frightening to those of us who have had the advantage of being there. There's a fragile ecosystem there. It's like a sweater. If you drop a stitch in a sweater, it starts an unraveling that is really almost impossible to stop.

This last corner is worth saving. We can have the wilderness and not destroy the oil. The reverse is impossible.

Thank you.

[The prepared statement of Ms. Reid follows:]

STATEMENT OF

SALLY M. REID

SIERRA CLUB VICE PRESIDENT

BEFORE THE

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

CONCERNING THE

ARCTIC NATIONAL WILDLIFE REFUGE 1002 AREA

OCTOBER 23, 1987

> Two large black and white birds obviously did not like to be disturbed, and dive-bombed the two of us, coming alarmingly close to our heads. Watching Les duck was a photo-opportunity, matched only by my similar action. With two cameras, we stopped a few feet from one another, and the angry pair lit, wings aflap, one on each hat, biting at the brims. Such a flurry could only mean a nest nearby, and a short but harried search revealed two dark green eggs of the long-tailed jaeger. Our curiosity satisfied, we ran off.

Mr. Chairman, members of the Committee:

My name is Sally M. Reid. I am Vice President of the Sierra Club, and member of the Club's Alaska Task Force for many years. I have spent a good deal of time in Alaska during the last twenty years, not only at meetings, but exploring the beautiful areas around Glacier Bay, Katmai National Monument, the Kenai Peninsula, the Kobuk Sand Dunes, the Noatak River, the Ambler, and most relevantly, the Arctic National Wildlife Refuge. I do all of these trips in Alaska, and many more, hiking, backpacking, boating, flying, and even driving--but mostly by foot, hiking--sometime on Sierra Club trips, but mostly with my husband following our own plans and logistics.

> It was in the late 70's that my husband and I were ferried, one at a time in a two-seat plane, to the base of the Brooks Range, near Mt. Michelson. Landing on the gravel bars, the plane made a series of twelve trips that day over the 70-mile plain from the Barter Island airstrip, waiting between trips for fog to lift and showers to stop. It was my great idea to draw straws for each spot in the sequence, so of course I drew the last one. But time didn't matter with 24 hours of light.

When we all worked on the Alaska Lands Act (ANILCA), in the last half of the 70's, we had to accommodate a large number of conflicting interests that resulted in many compromises that haunt us in this decade, and will continue to for many years. The worst of these, if one can possibly prioritize some of the assaults on the land and the animals that are occurring in the new national parks, monuments and preserves, was the compromise to put off resolving the issue of wilderness for the coastal plain of the Arctic, the 1002 area in the Act.

> Flying at low altitude, we spotted and circled a frightened grizzly bear and photographed its upturned head. We saw no other animals, despite the sweeping view of many miles across that desolate plain. Flying in over the half dozen tiny tents gave proportion to the size of the area we were being left in. When the plane took off for that twelfth time, it was not to come back.

What do we need the oil for, that we're fighting about this year? There's not enough oil to make us energy self-sufficient, by even the wildest exaggerated claims. Do we need it for cars, that have just been given an extension of years to make even the slightest change in their fuel efficiency? Do we need it to heat our homes, after our noble start at solar water heating and passive solar siting has been allowed to languish, with no attention from this administration, and no tax support? Or do we need the oil to ship to Japan, to make a balance in trade? Do we need it to build more freeways for more cars, instead of supporting mass transit in our crowded cities? Are these the things that our final strategic reserves are supposed to be used for? And what about when they're gone, when all the oil is gone? Where is our wilderness, and where is our advanced technology to show us new ways?

> Wilderness in the Arctic is very lonely. It is not swarming with animals, and there's not much to do in the usual sense. Just things like walk up the canyon a ways, until you get to a side stream that is too wild to cross. And you can explore the side canyons, hiking along steep scree traverses--and looking around, stopping from time to time as you pick your

> way along, to identify a bird or a flower...but no trees, no trees at all. But mostly what you do when you stop, is FEEL your surroundings, feel your aloneness, feel the stark beauty.

Caribou are the animal of the hour these days. For millenia the Porcupine herd has come out on the Arctic plain from 400 miles away in their wintering habitat, to feed and calve, thousands and thousands of them, one hears, scattering across the plain, and gathering together again when the time is right for them to start the journey back to the shelter of the Canadian taiga. The caribou tie together thousands of square miles of varied landforms, under territorial control of two countries, with many separate land designations in each.

> Isolated groups of caribou are seen here and there, along a ridge or silhouetted on the horizon, or at the edge of one of the roaring streams that wind down from the mountains across the plain. Seeing the reintroduced musk oxen herds is an experience I've read of, but not had. Two of our members glimpsed a wolf high in a valley.

The de facto wilderness of the Arctic Coastal Plain is not a wide expanse of land covered with animals, nor is it a broad plain that can be chopped into a series of discrete pieces, the one not affecting the other, or either the whole. The 1002 area is a part of the Arctic Coastal Plain, the whole entending eastward to the MacKenzie River, as far east of the Alaska-Yukon border as it extends west.

> Crossing a deep swift braid of the Okpilak late one afternoon, I lost my footing, drenching my clothes, but otherwise hurting only my pride. It was a clear bright night and we draped pants, shirt, jacket, socks and underwear on willow branches and tent top, to dry in the midnight sun.

Canada's concern for the the Arctic Wildlife Range dates from the 70's, when Justice Berger of Canada interviewed dozens of Canadian native villagers, and refused to allow an Alaska gas pipeline to traverse that portion of the Yukon east to where the MacKenzie River empties into the Arctic, to follow the river's course south across Canada to the United States. Since then, the Canadians have protected the northwest corner of their lands as the Northern Yukon National Park, with a proposed National Preserve adjoining to the south, each in turn adjacent to the Arctic Refuge across the border. The Canadian Government has advocated protection by the United States of the coastal plain of the Arctic Refuge, to protect the Porcupine herd on its summer migration.

> Walking amiably together along a dry portion of tundra, we almost fell onto a snowy owl nest. The incredibly huge white bird flew away in terror, revealing three tiny naked pink owlets and one unopened shell. We could not resist a photograph, but then moved rapidly away.

The international political consequences of development of the 1002 area may affect far more than even the development-prone may intend. The beautiful Stikine River is threatened by massive hydroelectric development, or alternatively, its preservation as a Stikine National Park Reserve. At the delta terminus of the Stikine River in southeast Alaska, adjacent to the proposed Canadian Reserve, lies the United States Stikine-Le Conte Wilderness. Preservation of the river on the Canadian side is essential for the integrity of the U.S. wilderness below. Other examples of our need for related international coordination include the proposed Peace River hydroelectric dam in British Columbia, Great Lakes clean-up, and acid rain export. While political maneuvers and attempts at coordination between our two countries often seem clumsy and with questionable motivation on one side or the other, we may be jointly proud of the establishment of the precedent-setting International Historic Trail, from Skagway in southeast Alaska across the border at Chilkoot Pass to Lake Bennett in the Yukon Territory, memorializing the treacherous goldrush route of 1898.

> After exploring the foothills of the high mountains of the Brooks range for a week, we shouldered our packs and the remaining food, and started the long hike along the Okpilak River, back toward the island and the airfield, some 70 miles distant. Hiking out along the Okpilak, between long eskers or ridges flowing out from the foothills, formed by glacial movement and subglacial stream deposition, we cover mile after mile of firm rocky rivershore, often alternating with squishy tussock land. Here your choice is walking between the tussocks, sinking to your knee or thigh, or walking along the unstable tops, tipping unexpectedly to throw you totally off-balance, dunking varying sections of arms, legs, or more.

A pair of "radar ears" stand over a hundred feet high on Barter Island, a part of the Distant Early Warning Station established at Kaktovik following World War II, still operating and still known as the DEW Line.

> From twenty to thirty miles out, the "ears" can be seen on the distant horizon, comforting in a way, though reminders of the encroaching modern world. More disquieting, though, are deep ruts from sleds dragged across the permafrost during construction of the DEW Line system still in service on Barter Island. Batches of 50 gallon oil drums dot the tundra, rusting in the short summer sun. Even this limited desecration is offensive to one's sensibilities.

The caribou may circle the drums or cross the sled ruts--those few remnants of anxious military days following WWII--in the same way as they move under the pipeline and through the developed areas at Prudhoe Bay. But Prudhoe is hardly a natural setting, predators having long since been eliminated. The natural population of predators is limited to the distant mountains south of Prudhoe, and caribou multiply.

> If you're lucky, and we were, you see three Dall sheep rams with their huge curled horns, outlined on a snowfield left over from a heavy winter. With field glasses you can watch them for awhile. Some miles further up you might even see other parts of the herd, the ewes and lambs gamboling along self-made routes on the sides of a cliff. But such sights are not frequent.

Dall sheep do not migrate, but spend the long winter somewhat lower in the valleys, pawing through the sparse snow, to the hardy lichen beneath, in a land that is known for its severe cold rather than for heavy snows. It's even called an Arctic desert, after its scant precipitation.

> Two of us headed for higher hill country one day, seeing a beautiful green meadow stretching for miles in a lovely high bowl. Standing there, we were able with binoculars to make out a herd of ewes and lambs, even some young rams. We photographed them from a distance with a long lens, but forebore creeping closer. It was their home, and we were intruding.

The northern permafrost melts on the surface in the summer, freezing over totally in the fall through late spring. The freezing and thawing of the surface ice shifts soil in curious ways, sometimes forming tussocks, sometimes low ridges, other times mounds as high as a person, always laced with the great braided meanders of the rivers as they flow north to the Arctic Ocean.

> The ground is less homogenous than realized from a plane. Crossing the plain on foot, one goes from the firm footing of gravel bars left from previous routes of north-flowing rivers, to the unstable humps in wet tundra that throw a walker off balance, to the broad hexagons of foot-high ridges around deeper areas of wetland.

We can see what will happen to the 1002 area by looking at Prudhoe Bay. There long miles of roads, oil wells and buildings dominate the landscape. Huge chemical waste pits cover the ground near each well--leaving known toxics to soak the thin soil above the frozen subsurface. What quantities of fresh water is being used in the drilling operations, and how does its contamination affect the in-stream biota, and the estuaries? A cruise line has organized bus trips to brings busloads of tourists to view the land. How long before we will have hotels and second homes--with inside temperatures like southern

California, courtesy of the oil from the Refuge? How many miles of roads, gravel pits, toxic dump pits, polluted water and air, and tourist impact can a wilderness survive and still be a wilderness? Hard data is not available, but we see no wilderness at Prudhoe.

A few days on the Arctic slope are all that are needed to understand that wilderness is not a partner of development. One must make a choice--there is no halfway point. Once development takes place, the balance between wolves, brown bear, Dall sheep, snowy owls, northern shrikes, hare, lemmings, Dryas mat, hexagons, tussocks, and braided rivers is sacrificed forever.

> Camping at night was a varied experience. Once, during a heavy fog, our group inadvertently split in two parts, one group of us pitching our tents on a carpet of dryas, its white blossoms visible in the mist, a strong sense of violating the beauty hanging over us with the fog. The next morning, clear and bright, found our missing half-party not a quarter mile away, on the shore of a small bright lake.

The natural movements of soil and animals, of birds and caribou, have characterized the Arctic Slope for millenia. The wilderness is like knitting a sweater--dropping a stitch starts an unraveling that only great skill can stop. We must not break the fragile ecosystem of the far north. This last little corner has value far beyond its exploitable minerals. We can have the wilderness and not destroy the oil--the reverse is impossible.

> One morning ritual consisted of a small fire on the river bank, burning paper trash--even toilet paper--which had been collected in a plastic bag. Extra fuel was carried to give the trash a start, and ash was scattered. But no matter how great our care, we realized even we were impacting a precious resource.

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Senator CONRAD. Thank you very much.

I would just like to take a moment to ask questions of the panel, and then we will turn it over to Senator Murkowski.

I would like to know what your reaction would be to somebody who held the following sets of beliefs: No. 1, that what you are saying is accurate, that if you have exploration that you will alter that area in a way that really cannot be repaired; No. 2, that clearly we have not had a coherent energy policy for a long time foolishly so, and that we will pay a price for that in the future; No. 3, that we face extremely serious problems with this national economy, most of it related to the budget deficit and a trade deficit that are out of control. The trade deficit is contributed to by oil imports in a major way. No. 4, that we have a collision course in terms of energy consumption in this country in the sense that our production is on a steady decline and our consumption is on a steady increase. No. 5, that we have the prospect of a recession on the horizon.

Given these cross currents and all of the things that are open to us—that is, improving fleet efficiency, conservation measures, renewable resources, development—all of that needs to be pursued, but also that further oil exploration and development must be pursued given the threat to our economy, and at the same time that there is a recognition that if you once intrude on this area, you alter it.

How do you answer the proposition that there are 57 million acres of wilderness, 18 million in this specific area and that 1.5 million or roughly 10 percent is what would be open to exploration? And isn't that a reasonable compromise given the other threats to the economy that we face? I would be interested in your reaction to that basic proposition.

Mr. ANDREWS. Do you want us to all speak at once?

Senator CONRAD. You can decide whichever one wants to respond, or if all of you want to respond, whatever order you choose.

Dr. PERKINS. Well, Senator Conrad, what you say—I don't remember which point numbers they were, but many of them make good sense, and I agree with what you are saying. But our basic problem is lack of a coherent energy policy.

And the question, as I see it, that you are posing is is it not true that development in Alaska would help us in economic ways and, at least in the short term, satisfy some of our energy demands. And I think that the answer to both those questions is maybe.

But on the other hand, what we have in Alaska is a national treasure that is unmatched anywhere. And the "maybe" is a very small maybe. It's very unlikely. The Interior Department's estimate show that the amount of oil that is there, if there is any that is recoverable, will be small. It's not substantial. All those conservation and alternative energy sources that you mentioned are much more significant. And the contribution that ANWR could make pales in significance.

The very thought of opening that area to oil and gas development—what can I say? I find it appalling. As an analogy, I would say that it would be similar to tearing down the Louvre and paving it over to put in a trailer park because of a temporary housing shortage. It just doesn't make sense in terms of long term when you consider the values that are embodied in that wilderness area and the very highly unlikely possibility that there is substantial petroleum there. It just doesn't balance in my mind at all.

Those other considerations that you mentioned are important, but they can be addressed much better by a coherent energy policy.

Senator **Conrad**. All right.

Mr. **Kohm**. Yes. You gentlemen have a tough job.

My feeling is that I don't think that we are going after alternative sources of energy aggressively enough.

And I live in Sonoma, California, which is a very desirable area to live. And our principal industry is the wine making business. And I think that one thing we need in Sonoma very badly is we need additional places to live. We need additional housing space. And I would shudder to think what would happen if I were to be the one to propose that we rip out all the vineyards, which is basically the center of our culture, and put in high rise buildings for housing.

I think we have to become more aggressive on alternative energy. And I think we have to become more aggressive on preserving what we have. My experience is that in the short time that I was there—and I'd like to show you this. Those lines, those seismic lines, and those initials were carved in the tundra by a company that the initials are GSI, and I think they were probably done 10 to 15 years ago. So, I have very little faith that the petroleum industry really cares about what they do with the land.

Mr. **Andrews**. I would like to echo the comments of the first panelist here about a lack of an energy policy. I think that the first step is to have a coherent energy policy, and then decide if—and then rank the need for that oil against all your other alternatives. And I think the alternatives that have worked for us since 1973 have been very effective. Witness the predicament that we put OPEC in in terms of the price drops. We can't produce our way out of this predicament.

The days of abundant, cheap energy are over. That is very expensive energy. That's the most expensive energy which we can produce in this country. I think the energy intensiveness, the sheer energy intensiveness, of supporting the oil industry up there, of flying everything up there, should not be overlooked. You may put in in the lower 48 1 unit of energy to get 10 units back. Up there you may put in 1 to get 5 or 4 or something of that nature. That's not a hard fact; that's just an analogy.

My last point would be on your very first question which is about the compromise issue. If you've ever floated the Colorado River, it's a wonderful canyon. You come streaming down in wonderful drops and so on. And then all of a sudden you hit the lake. Glen Canyon Dam is far in the distance. You can't even see it, but your wilderness experience is over. And I think the same thing will happen up there. You may only have 12,000 acres that are so-called in the footstep of this development, but in fact, the impact will be far larger. It will hit the essence of what that's all about. If we only have one left, I think you should look at all the other alternatives through an energy policy, a coordinated, well-planned energy policy. And I would echo the opinion of my senator, Senator Wirth from Colorado, that we do not have one, and we desperately need one.

Ms. Reid. I think that my companions on this panel have spoken very well to the series of questions that you asked.

I think we have to look at what this administration has done. We had a crisis in the 1970s, and we met that crisis by cutting down on the use of automobiles. The price of gas was very high. We met it by the fact that there was a tremendous push for solar energy in homes. The siting of homes was—how they turned in in terms of getting passive solar energy, the installation of solar panels and so forth—all of the kinds of things that we found very easy to do and were supported by the Federal Government through tax supports. All that has disappeared. Automobiles which were under yearly constraints of having to be produced in Detroit to have better gas mileage—that has now in the last few years been allowed to slip—that date. Why bother? Oil is cheap. We can get all we want from the Persian Gulf.

We are really not talking—and I think this has probably been said. We are really talking about a relatively small amount that can't at best make a big difference in this whole picture. We are not looking as a people in the United States. We are not taking the time to look at where we are going with this energy situation. There is an end point of oil on this finite planet that we are on. And since it seems to suit us very well to use oil—we like it and we like the way it moves us around—I think we should make it last as long as we possibly can.

And I see no movement in that direction whatever. And I would like to guarantee that all of the people who are here, if they felt that it was part of a national movement to really make a difference in this country, would stop flying into the arctic plain to enjoy it. Most of the people who go there now go with the very definite idea of seeing it and trying to preserve it. That's the kind of exposure to the arctic plain that we get. That certainly was the reason that I wanted to go there, to see what this is about, and then see why it hadn't been included in the ANILCA legislation and see what we could do to change that.

So, I think that the whole picture is not being looked at. And just getting whatever oil is there is not going to make that much difference. It is not going to put off the day when we have to make these decisions anyway. We might as well get at it and resolve the problems and try to resolve them. There's a lot of technology that we have to get with in order to supplant and replace and have alternatives for the kinds of energy that we find very easy to have right now.

Senator Conrad. Thank you very much. I appreciate the answers to that question.

Senator Bumpers is going to take over chairing this meeting. I don't know if Senator Bumpers has any questions——

Senator Bumpers. No.

Senator Conrad [continuing]. I assume not—of this panel.

We want to thank you once again for taking the time to come here to share with us your views. As I said before, your full statements will be included in the record. And once again, this committee would like to thank you for your participation.

Mr. Andrews. Senator, could I submit some answers to your long question? A colleague of mine sent this along. Could I submit this for the record as well?

Senator Conrad. Absolutely. Without objection, that will be included in the record.

[The material follows:]

ENERGY AND THE GLOBAL ENVIRONMENT

Joel N. Swisher
Boulder, Colorado, USA
20 July 1987

The purpose of this paper is to show that energy issues are of fundamental importance to environmental health and economic prosperity. Energy problems reach far beyond national borders, and the solutions to these problems are urgently needed to avoid ominous international security and environmental crises.

The bright side of this rather dire situation is that emerging energy efficiency and renewable energy technologies which can alleviate these problems provide a potentially huge export market for the United States and other Western nations. This "win-win" situation is an opportunity to pursue environmental and economic goals which are compatible and mutually beneficial.

There are five major points to be made in this discussion:

- Energy is the disease for which many urgent environmental problems are symptoms.

- Oil imports are a major U.S. national security problem with an environmentally acceptable solution (efficiency and renewables), but current policy is pursuing exactly the opposite approach.

- Efficiency and renewable energy technologies also provide economic benefits, but they are obscurred by market distortions and unequal subsidies.

- These technolgies are a potentially huge export market and a key to staying competitive in international trade.

- Global environmental problems and military tensions are closely related, and their solutions depend heavily on the implementation of efficiency and renewables in developing nations and in the Eastern Bloc.

Most of today's urgent environmental problems are the result of excessive and usually unnecessary energy demands. Consider air pollution. Acid rain is the result of sulphur emmissions from burning coal for electricity. Photochemical smog is mostly the result of inefficient urban transportation systems and vehicles. The climate changes threatened by the build-up of atmospheric carbon dioxide are the result of all fossil fuel combustion, especially coal.

Nuclear waste and safety problems in commercial reactors are all for the sake of one product: electricity. Offshore oil leasing, including the current threat to the Arctic National Wildlife Refuge, is meant to increase oil supplies. Many of the memorable environmental battles in America have been fought over energy facilities: hydroelectric dams in the Grand Canyon, coal mines

Near Bryce Canyon, a nuclear waste dump under Canyonlands National Park, and the "National Sacrifice Area" proposed for synthetic fuels development in western Colorado.

In addition to acid rain and the global carbon dioxide build-up, other international environmental problems also stem from energy development. Increasing demands for firewood are causing much of the drastic deforestation problems in South Asia, Africa, and the Andean countries of South America. Inefficient energy use, and the capital and foreign exchange demands of energy production, threaten to undermine the economic development of the more advanced developing countries of South America and Asia.

Fortunately, there are other oil and natural gas fields, and many other potential sites for electric generating stations. The vehicle fuel efficiency "oil field" is one of the largest and most promising. The home insulation "oil field" is a huge resource in the Northeastern U.S. where many houses are heated by oil. In the West, Midwest, and South, there are the insulation "gas field" and the passive solar building "gas field."

For electricity, we need look no further than the efficient light "power plant," the efficient motor "power plant," and the efficient appliance "power plant." Each of these facilities have thousands of megawatts, or "negawatts" as coined by Amory Lovins, of potential capacity. There is also enormous potential in deriving electricity from the wind, the sun, and industrial waste heat.

The environmental advantages of exploiting these resources are great, compared to increased production of fuel and electricity, as proposed by Interior Secretary Hodel's Utility Policy Project. The difference between these two approaches, over the next twenty years, represents huge environmental costs to the U.S. and its neighbors. They begin with about 50 million tons of sulphur dioxide in the atmosphere, much of it drifting over Canada. Over a thousand square miles of strip mines would be necessary for coal, and nuclear power would produce about 25 million cubic feet of radioactive waste. In addition, fossil fuel combustion would further exacerbate the global carbon dioxide problem.

The latest environmental scare is the proposal by Secretary Hodel, backed by the oil lobby and Alaska's senators, to open 1.5 million acres of the Arctic National Wildlife Refuge to oil and gas development. Hodel has correctly recognized the recent increase in U.S. oil imports and the associated Middle East security risks, and he is using this to justify an environmental disaster to increase domestic oil supplies. He has refered to this proposal to ruin the habitat and breeding ground of millions of caribou, wolves, bears, and birds as a "cornerstone" of U.S. energy policy.

This is reminiscent of previous Hodel antics. As the director of the Bonneville Power Administration, Hodel used threats of power shortages to convince Pacific Northwest utilities to participate in the Washington Public Power Supply System (WPPSS). The result of this ill-conceived and unnecessary scheme was $10 billion spent on four abandoned nuclear stations and near bankruptcy of an entire region. After making the worst energy planning mistake in history, what happened to Donald Hodel? President Reagan promoted him to Secretary of Energy and later to Secretary of Interior!

Now Hodel wants to destroy the Alaskan wilderness, and for what? Interior Department estimates predict a 19 percent chance of finding any oil at all. These are very good odds for the oil exploration business, but a completely unacceptable risk for the nation. Moreover, the amount of oil that would be recovered, under optimistic reserve estimates, could be replaced by restoring the automobile fuel efficiency standards, which the Reagan Administration rolled back, and insulating the uninsulated oil-heated houses in the Northeast. This solution would be cheaper, cleaner, faster, and more certain than drilling in the Arctic.

Even if oil is found in Alaska, it would not help our fuel problems anytime soon. Falling oil prices in recent years have caused thousands of marginally economic wells to be capped, and Arctic oil would be still more expensive. Oil producers would have to wait until the next fuel crisis raises prices to put new wells into production. They would benefit from this scenario, but the public would not.

It is very unlikely that a new oil discovery will be large enough to reverse the decline in U.S. oil production, which peaked back in 1970. Since that time, two fuel crises have occurred, during each of which oil prices tripled. At first the public refused to believe that the fuel shortage was real, blaming the government and the oil industry. Oil corporations were accused of illegal windfall profits and required to refund $15 billion in excess charges to consumers. Meanwhile, the industry blamed government regulations and environmental precautions for high prices and falling production.

Oil production leveled off in the 1980's before dropping in 1986 in response to falling prices. There is no evidence to suggest that this trend will not continue, regardless of price fluctuations. Moreover, there is little hope that other Western nations will make up for falling U.S. output. The only significant new oil exporters to emerge in the last fifteen years are Britain, Norway, and Mexico. Of these, only Mexico can export enough to have an impact on the U.S. energy budget. There is potential for further oil discoveries in Latin America, but major increases in exports are unlikely.

The simple fact is that the U.S. accounts for 30 percent of world oil consumption, 20 percent of world production, and only five percent of known world reserves, despite the most ambitious exploration efforts. The OPEC nations now have 75 percent of known world reserves, and those in the Middle East have 55 percent. Their share of the remaining reserves is increasing, because the U.S. is depleting a greater share of its reserves each year. This means that trying to increase domestic production in the name of energy security would accelerate the concentration of remaining world reserves in the Middle East, making the U.S. increasingly vulnerable!

It is clear that alternatives to oil are needed to reverse the trend that saw Middle East oil imports double in 1986 alone. The current level is about the same as in 1973, when the first fuel crisis ocurred. Total imports are about the same too, as are domestic oil production and total U.S. oil consumption. In fact, total U.S. energy consumption in 1986 was just slightly less than that in 1973, despite a 35 percent increase in gross national product during the same time period.

It may appear that the U.S. is in the same predicament as in 1973, having made little progress in solving energy problems. However, great progress was made by increasing the amount of economic activity derived from each unit of energy by 35 percent. Some of this productivity increase, between a quarter and a half, has resulted from a basic shift in the American economy from heavy process industries to more light manufacturing and services. The remainder is due to efficiency improvements in buildings, vehicles, and industry.

These efficiency improvements provided many times more energy services than all new energy supplies combined. They reduced the OPEC share of U.S. oil supplies from over 30 percent in 1978 to 17 percent in 1986. This reduction lead to the recent oil glut and the falling oil prices which stimulated the inflation-free growth of recent years.

The bad news is that an upturn in imports could reverse these positive trends abruptly. The good news is that the technical and economic potential for energy efficiency improvements has not yet begun to be exhausted. Japan and Western European nations are already twice as efficient as the U.S. Rather than being stuck in the same predicament as 1973, the U.S. now has a great opportunity to pursue a long term solution to its energy problems and related environmental problems.

The need for alternatives to oil is often used as an excuse to push for building nuclear power plants. This argument assumes that significant oil supplies are used to make electricity, which can be replaced by nuclear power. This is simply false, because almost no oil is used for electric power. Furthermore, most areas of the U.S. have more electric generating capacity than needed, and the costs of nuclear power make efficiency, cogeneration, hydropower, wind, and other sources more attractive now and in the future.

It is ironic that, although energy efficiency improvements throughout the U.S. economy have contributed heavily to the recent growth and prosperity, the Reagan adminstration has reversed many of the policies that helped implement these improvements. Recent actions included rolling back the vehicle fuel efficiency standards, supporting the higher speed limit, and vetoing the appliance efficiency standards, which eventually became law anyway. Federal tax credits for energy efficiency, solar heating, and wind power have been cut while most tax breaks for the nuclear and fossil fuel industries remain. The Reagan administration has eliminated the Solar and Conservation Bank and the Residential Conservation Service.

The Department of Energy (DoE) budgets for energy efficiency and renewable energy have been cut 60 percent from 1980, and the 1988 budget request is 85 percent below 1980 levels. This is not a new trend. Each year since 1982, the DoE has recommendsed huge cuts in efficiency and renewables, usually zeroing the funding for solar heating, before Congress has restored some fraction of the remaining budget. DoE funding for nuclear power has remainded relatively constant. However, an increasing share of the DoE budget has been devoted to nuclear weapons production which now accounts for 65 percent of the total DoE budget!

It is questionable whether this weapons expenditure, about $8 billion in 1987, makes the U.S. more secure. It appears certain, however, that if the same funds were spent instead on energy efficiency, the resulting decrease in oil imports and environmental disruption would provide truly lasting security benefits. In fact, the decrease in imports alone would probably repay the expenditure.

The success of energy efficiency improvements, despite a contrary Federal policy, has made imported oil appear inexpensive. New domestic energy supplies, however, promise only to be more expensive. This is because new fossil fuel supplies are getting more difficult to recover. New electricity supplies before 1970 were getting less expensive, due to technical improvements and economies of scale. Since then, however, marginal electricity costs have been rising due to higher fuel costs and the greater capital intensity of new technologies.

This was a fundamental change in the energy business. When new supplies were cheaper than old supplies, there was no incentive to look for alternatives. Only recently has energy efficiency become a desirable commodity. Unlike nuclear power, which was once claimed to be the sole solution to energy problems, efficiency measures are numerous and diverse. They come in relatively small packages but exist whereever energy is used.

As mentioned earlier, the potential for saving oil is enormous. A three mile per gallon increase in automobile fuel efficiency would replace the potential reserves under the Alaska National Wildlife Refuge. This does not even begin to exhaust the technical potential for fuel economy, which could be doubled or tripled.

The other measure available for saving huge quantities of oil, and even more natural gas, is to upgrade the energy efficiency of the national housing stock, and to design new houses to be energy misers. Simple weatherization, furnace maintenance, and ceiling insulation can reduce home heating bills by 25 to 50 percent. Such savings and more are cheaper and easier to achieve in newly constructed houses. Passive solar houses, which are designed to heat themselves by collecting and storing solar energy, have been extensively tested and shown to save 75 to 90 percent of the energy used by existing houses.

These building energy savings are some of the least expensive energy investments available today. Many communities have a wide variety of programs to encourage energy improvements in existing buildings and efficient designs of new buildings. These take the form of financial incentives, education programs, energy rating systems, building codes, and performance standards.

Home energy savings do not end with heating. Efficient appliances such as water heaters, refrigerators, and air conditioners can save electricity more cheaply than it can be generated by new power plants. The new Federal appliance energy efficiency standards, passed despite the President's pocket veto, are expected to save the equivalent of several large power stations.

These savings may seem insignificant in the total energy picture, but consider the six million refrigerators sold each year. If only the most efficient in each size category are sold, the savings would replace a large power plant each year, at one-sixth the cost. Individual consumers can find, by comparison shopping, efficient refrigerators that are cheaper than their less efficient counterparts.

Commercial buildings present even more attractive energy saving opportunities. Inefficient lighting is especially wasteful, because the unnecessary lighting energy usually increases air conditioning energy use. Incandescent lights can be replaced by flourescents that are six times more efficient with no net cost because the flourescents last longer between replacements. Standard flourescent lamps, ballasts, and fixtures can be replaced to achieve about 75% savings at a cost of only one cent per kilowatt-hour. In new buildings and existing buildings with large areas near perimeter windows, the lighting controls can be designed or modified to reduce electric lighting levels in response to natural daylight, achieving similar cost-effective savings.

Heating and cooling systems in commercial and industrial buildings are also very inefficient, due to obsolete design and poor maintenance. A new generation of energy management engineers are developing methods to upgrade the equipment and controls in large buildings, complete with financing packages that reduce the building owners' capital costs for efficiency improvements.

Industrial energy efficieny has been increasing every year since even before the oil crises. New processes and greater use of electronic controls and waste heat recovery continue to reduce industrial energy intensity. Industrial plants with large process heat requirements also have the opportunity to generate electric power simultaneously with their process heat. This process of cogeneration requires 40 percent less fuel than separate generating facilities and provides the cheapest source of electricity now available.

Renewable sources of electric power are also abundant. The most familiar is hydroelectric power, which currently supplies 14 percent of U.S. electricity, about the same as nuclear power. This amount could be doubled, mostly by developing the many relatively small sites available and redeveloping existing sites. Many of these potential sites would cause substantial environmental impacts, but many would be acceptable, especially in comparison to coal or nuclear power.

Wind power grew explosively in California and Hawaii from 1983 through 1985, when Federal tax credits and attractive utility buy-back rates expired. The total U.S. capacity, mostly concentrated in three California "wind farms," exceeds 1000 megawatts, about the size of a large nuclear plant. Wind farms have been criticized as producing more tax breaks than energy, and indeed some systems have performed poorly. However, the best performers among the wind systems installed to date are efficient enough to produce power that is competitive, without tax credits, against nuclear power.

This wind power capacity was developed in a fraction of the time that would be needed to build a nuclear plant, an important benefit to utility planners. Shorter lead times and smaller individual units allow planners to use a shorter time horizon without worry of running short of generating capacity. This helps to prevent the severe overpredictions of demand, such as those which caused the WPPSS debacle, which result from the long construction lead times and huge size of nuclear power plants.

Several different technologies are available which concentrate solar energy to achieve high temperatures for electricity production. The costs of these systems have fallen steadily to the point where privately financed systems are being installed, without tax credits, in the California desert. Critics point out that large land areas are required for solar power plants. The land required per megawatt is about the same as that required, for safety reasons, by nuclear power stations.

Perhaps the most promising solar technology for making electrcity is photovoltaics. These are semiconductor devices which convert sunlight directly to electricity with no moving parts. Invented for the space program in the 1950s, photovoltaics have fallen in cost from hundreds of dollars per kilowatt to about seven, very close to being commercially competitive. There are numerous individual photovoltaic materials under development, each with promise for providing inexpensive power for both remote and utility grid-connected applications. The simplicity and decentralized nature of photovoltaics make them especially attractive for providing power to assist third world development.

Renewable energy technologies are not free of environmental impacts, particularly local land use issues. These impacts vary from site to site and are sometimes unacceptable. The majority of renewable projects, however, are environmentally benign compared to conventional energy sources.

The potential is great for providing direct heat and light and generating electricity from renewable sources. Transportation fuels, however, present a more difficult challenge. Fortunately, vehicle fuel efficiency can stretch oil supplies far into the future, providing a bridge to a renewable energy future. There are several candidates for the future fuel, but each has serious technical, environmental, or economic obstacles.

One solution would be a partial electrification of the transport system. It is questionable whether the necessary infrastructure changes would be possible. Moreover, a massive electrification program, even with renewable resources, would have severe environmental problems. The cleanest fuel choice would be hydrogen, which can be made from water and electrcity. This scheme faces major technical hurdles and the same environmental questions as electricification.

Alcohol fuels have the greatest near-term potential. Methanol can be made from a variety of feedstocks, including wood, farm wastes, coal, and natural gas. It requires significant engine changes, however, and is questionable environmentally because it could increase the demand for coal production.

Ethanol can be made from sugars and starches. Many high octane fuels contain ethanol as an additive, and pure ethanol can be used in conventional engines. Brazil, with large sugar supplies and cheap labor, has a successful ethanol program, although it has significant pollution problems and has required large subsidies to compete with cheap oil. U.S. ethanol is produced from corn, which is more expensive and less energy efficient than ethanol from sugar. It has, however, provided a market for surplus corn and bolstered the economies of Midwestern farming communities. Important research is underway to develop hydrolysis processes to convert wood and other plant feedstocks to ethanol. Although commercialization is still distant, this may be the best renewable fuel prospect.

This is just a sample of the many diverse forms of renewable energy technologies available. Others include solar water heaters, solar ponds, wood, energy from wastes, etc. None of these individual options alone provide a panacea for solving national or world energy problems. However, properly matched to local climates and energy needs reduced by efficiency measures, these technologies together provide an environmentally and economically atractive alternative to further exploitation of fossil and nuclear resources.

Many of the efficiency and renewable energy technologies now available are much cheaper than new fuel and electricity supplies. They also promise environmental and security benefits. Why are they not penetrating the energy market faster? The reason is that the energy market is far from being a competitive free market. Instead, it is a morass of biased subsidies and distorted access to capital resources that result in a suboptimal allocation of energy expenditures.

The most thorough accounting of energy subsidies to date has been done by Richard Heede at the Rocky Mountain Institute. Heede's 1984 subsidy estimates include everything from direct program funding to tax incentives such as depletion allowances and accelerated depreciation. The totals for each energy source are compared to 1984 energy supplies in the table shown below:

	1984 Energy Supply (Quadrillion Btu)	1984 Federal Subsidy (billion dollars)	Ratio MBtu/$
Efficiency	11.5	.9	13.0
Coal	19.0	3.4	5.6
Natural Gas	17.5	4.6	3.8
Oil	20.6	8.6	2.4
Renewables	3.9	4.0	1.0
Fossil Electric	4.5	5.6	0.8
Nuclear Electric	1.1	15.6	0.1
Synthetic Fuels	0.0	0.6	0.0
Fusion	0.0	0.7	0.0

The energy efficiency "supply," which credits half the total energy productivity increase over 1973 levels, is by far the largest per dollar of Federal subsidy. Nuclear electric provides the least energy per Federal dollar of the commercial sources. Taken together, efficiency and renewables deliver 25 times as much energy per subsidy dollar as nuclear power.

Since 1984, tax credits for efficiency and the young renewable energy industries have been nearly eliminated. Meanwhile, most tax breaks and other subsidies remain for fossil and nuclear sources, which are already commercially mature industries. As a result, the current picture is even more biased than that shown above for 1984.

These huge subsidies make conventional energy supplies appear artificially cheap and discourage investments in efficiency and renewables. An even more powerful market distortion prevents investments in efficiency even when the apparent costs are much less than new energy supplies. The initial costs of efficiency and renewables are often more difficult to finance than conventional energy supplies.

Understanding this paradox requires and examination of the relationship between the flow of energy and the flow of money. A simple but essential feature of this relationship is that the people who produce energy resources and those who use them are two entirely different groups, with vastly different investment priorities and access to capital.

One one hand, there are the utilities and fuel producers, who have capital available for energy investments but lack the ability to address the many dispersed efficiency opportunities. On the other hand are energy users, who can realize the efficiency opportunities, but only if their budgets are not depleted by other financial commitments.

Energy users rarely have adequate knowledge to make optimal energy investments, and they almost never have access to capital with terms as attractive as those available to energy suppliers. Moreover, since they are not in the energy business, energy users do not consider potential energy investments on equal terms with other possible expenditures. Businesses would likely choose to invest in a new product line, and individuals might choose to buy a new television, rather than buy efficient lights, insulate their roof, or install solar heating.

Many efficiency measures that pay for themselves in two years or less, yielding a 50 percent tax-free return on investment, do not appear beneficial to energy users. A classic example is the rental property situation. The tenant has no incentive to make an investment, no matter how attractive, in the owner's building. Meanwhile, the owner has no incentive to spend money in order to reduce the tenant's energy bill. Even if savings cost one cent per kilowatt-hour and electricity costs ten, the tenant is forced to buy the electricity. Eventually the utility must build a new power plant, and this drives the price of electricity higher still.

In addition to removing or at least equalizing energy subsidies, there is an obvious need to make energy investment capital available for efficiency investments. Fortunately, Public Utilities Commissions in an increasing number of states, lead by California, have realized this. They have begun to require that electric utilities invest in efficiency improvements wherever cheaper than new capacity. Also, Federal law now requires utilities to buy power from independent producers, who often use renewable sources, at the avoided cost of conventional power supplies.

Utilities have embraced these initiatives to varying degrees, depending on how much excess generating capacity they already have. Many utilities are severely over-built and are trying to sell more power in order to justify their existing capacity. Investing in efficiency is such a fundamental change in the way utilities do business that there is a great deal of hesitance and resistance to making such a change. Also, there are very complex issues regarding utility cost recovery and the reliability of customer energy savings from loans or rebates for insulation, efficient lights and appliances, etc.

Financing fuel efficiency improvements is even more difficult. It appears that some type of fuel tax is necessary to discourage inefficient consumption and to make funds available for the development of alternatives. The U.S. recently missed a golden opportunity to implement such a program by adding just enough tax to the price of fuel to keep it constant as world oil prices fell. This would have been a relatively painless way to collect funds to finance fuel efficiency. Moreover, keeping the price higher would have encouraged additional conservation, which might have maintained a large enough oil "glut" to keep world prices down for a longer time. Instead, the government has sent only the opposite signals, by rolling back the vehicle fuel efficiency standards and encouraging wasteful consumption.

A fuel tax still appears to be a reasonable, although more painful, measure. Some of the proceeds should go to vehicle manufacturers to stimulate more efficient models. This is contrary to free market principles, but if there were a free energy market such measures would not be necessary.

The government also fails to practice what it preaches in regard to international competitiveness. Energy efficiency and renewable energy technologies represent a potentially huge export industry that could help restore American competitivenss. Instead of fostering this young industry, the Reagan administration appears to be openly practicing sabotage against it, to the detriment of U.S. economic standing.

These are technologies that the U.S. either invented or held near monopolies until recently. In many cases, the technical advantage remains, but the market lead is being lost to more aggressive foreign competitors.

The examples are many. The U.S. invented photovoltaic technology but lost the world market lead to Japan in 1985. This is no coincidence, given that U.S. funding for photovoltaics has been cut by 30 percent since 1982. Meanwhile Japanese manufacturers receive strong and consistent incentives to develop this promising technology. The U.S. still holds the technical advantage in many of the most promising photovoltaic technologies, but it may be difficult for them to penetrate the international market if current trends continue.

The situation is similar in wind power. Many of the most efficient and cost-effective machines in the California wind farms are Danish, rather than American. Denmark has active programs to finance overseas wind projects that use Danish machinery, and they are pursuing new markets in developing countries. The U.S. still leads in advanced wind technology but is losing its market share.

Ten years ago, there were less than thirty solar collector manufacturers in the U.S. In 1982, spurred by Federal and state solar tax credits, the number had increased to over 200. The elimination of solar tax credits at the end of 1985 decimated the industry, and now the number of manufacturers is back below thirty. It can be argued that the tax credits were not entirely necessary or fair, and that some manufacturers were not credible. There is no question, however, that the sudden removal of such a strong incentive is no less than sabotage of a young industry. Australia, Israel, and Japan are now poised to lead the world market.

Foreign competitors are taking the lead in other renewable energy technologies. Brazil leads in ethanol production, and Israel in small turbines for solar thermal power plants. China exports small impulse turbines to the U.S. for hydroelectric plants.

The same trend is taking shape in efficiency technologies. Dutch and Japanese manufacturers are far ahead in the huge market for efficient lighting equipment. U.S. firms have only recently entered the market. Sweden and Japan have superior technology for energy efficient manufactured housing and are actively funding research and development and pursuing export markets. Japan is increasing its market share in energy efficient product lines ranging from air conditioners to electric motors, often with little response from U.S. competitors and no response from the Department of Energy.

Japan is taking over the power electronics market, once dominated by American firms, with new high efficiency, electronically controlled motors. Despite the huge market and potential energy savings, the DoE shows little interest in supporting U.S. research in this field.

Energy efficiency and renewable energy exports promise "win-win" results. The U.S. and other Western economies benefit from the foreign trade, and reductions in the use of fossil and nuclear resources promise even more important benefits for the global environment and international security. This is a rare opportunity for people concerned about these issues to advocate environmental measures which promote economic competitiveness.

Recent reports from the Central Intelligence Agency and British Petroleum Company indicate that Soviet oil production will soon peak and begin to decline. This means that Eastern Europe and eventually the U.S.S.R. itself will turn to the Middle East for their fuel supply. This potential resource competition with the West would be a far greater security concern than the already tense situation in the Middle East.

China, the Soviet Union, and Eastern Europe currently account for about half of the world's coal consumption, and they hold more than half the remaining reserves. The industrial base in these nations is far more concentrated and rapidly growing in the heavily energy-intensive process industries than in the West. Unlike the Western nations, which get more energy efficient each year, the Eastern Bloc nations are getting less efficient. If these trends continue, they provide a recipe for unprecedented levels of coal combustion and carbon dioxide release, potentially leading to significant climate changes and global environmental disaster.

Increasing Eastern Bloc energy use is creating serious environmental and security risks. These global risks are even greater than those now apparent in the West. It is therefore in the best interests of the Western nations, for both environmental and security reasons, to seek ways to introduce energy efficiency technology to the Eastern Bloc.

The potential impacts of continued energy growth trends in the Eastern Bloc are so severe that it is not an exaggeration to say that this is a matter of survival. The gravity of those problems transcend the traditional East-West military rivalries. The diversion of funds from military preparations toward energy efficiency cooperation would provide more true security than adding to each side's arsenals. Seen from this perspective, military expenditures are actually diminishing international security.

Exporting energy efficiency and renewable energy technology to the Eastern Bloc can help solve serious international problems. It is also good business. Export opportunites exist in the developing world as well, and they too promise crucial environmental and security benefits.

Already deforestation and other forms of environmental damage have caused military tensions among developing nations. Resettlement of Indonesians from overpopulated and deforested Java to Irian Jaya is causing severe environmental problems and conflict with Papua New Guinea. Military conflict between Ethiopia and Somalia, partially financed by both superpowers, was the direct result of deforestation in the Ethiopian highlands. The total military expenditures were several times greater than the United Nations estimate of the cost of reforestation.

Firewood demand in many developing countries is accelerating their severe deforestation problems. New efficient stoves, solar cookers, and biogas digesters which convert human and animal waste to methane fuel provide alternatives that are appropriate to the village scale.

Wind and photovoltaic powered water pumps can provide irrigation and clean drinking water to villages which otherwise lack adequate food and water. Photovoltaics can also provide electricity on an appropriate scale for essential services such as radio communication and medical refrigeration. Many villages use most of their electric supplies for simple lighting, and efficient lights can provide a key to expanding the usefulness of their electric service.

In the more advanced developing nations, such as Brazil, Singapore, and Thailand, energy is a key to sustainable development. The international lending organizations such as the World Bank have favored large capital-intensive energy production facilities, based mostly on fossil or hydro resources. Many of these projects have been environmental disasters and economic losers, contributing to the foreign debt crisis.

Continued development depends on reducing electricity supply constraints, but expanding central generating capacity is often not the most economic solution. Increased efficiency in lighting, motors, and refrigeration provides a cheaper and more reliable alternative. Implementation of efficiency improvements in developing nations faces many of the same institutional barriers as in the developed world, including consumer knowledge, subsidization, pricing, and access to capital. The World Bank and other organizations can help these nations immensely by shifting their focus from large energy production schemes toward energy efficiency and decentralized renewable sources.

In the village of Khandia, India, deforestation had depleted the village's firewood supply, and electrification was prohibitively expensive. An Integrated Rural Energy Center, based on several renewable energy technologies, was developed to harness solar and biomass energy to meet all village energy needs. Renewable energy resources successfully met the energy and economic needs of the village and reversed the pattern of deforestation and environmental damage.

The Khandia project cost the Indian government roughly $100,000, or about $100 per person served. Approximately one million villages in developing countries require the same level of energy development, so the cost of energizing the developing world with renewable resources would be about $100 billion. This estimate may be low. However, even if the true cost is ten times higher, it would still amount to less than one year's global military expenditure, which now exceeds one trillion dollars.

The cost of supplying clean water and adequate sanitation to the two billion people who lack these basic essentials has been estimated at $300 to $600 billion. Thus, it appears that both basic energy and water resources could be provided to the world's needy by diverting less than one year's military spending.

The world's enormous military expenditures cause continued environmental decline, because of the environmental impacts of military activities and because funds are diverted from environmental restoration. Global environmental degradation and resource depletion lead to further military tensions, which stimulate greater military expenditures, which cause further environmental decline, and so on. This merciless feedback loop will not stop until military conflict and environmental destruction become uncontrollable.

That's the bad news. The good news is that a similar feedback loop can operate in the opposite direction. Diverting military funds into environmental conservation and renewable resources can relieve military tensions caused by environmental damage and resource depletion. This enhances international security and reduces the need for military spending, which frees more funds for environmental purposes, and so on. The result of this feedback loop will be a safer, healthier, and richer planet.

The environmental solutions, many of which depend on implementing energy efficiency and renewable resources, are known today. Many environmental relationships are not well understood, and many of the promising technologies need further research. However, enough is known now to make considerable progress toward solving the Earth's urgent environmental and resource problems. Only the political will is lacking to commit the necessary human and financial resources.

I urge anyone reading this paper to use whatever means are available to you to see that this commitment is made, so that the latter, rather than the former, of the two scenarios described above, is the one that becomes reality.

Senator Bumpers [presiding]. Our next panel will be Mr. Burns Ellison of Columbia, Nebraska; Martin Hayden, Defiance, Missouri; and Allan Sawtelle, Cincinnati, Ohio. If you will come up.

And let me just begin the remainder of this to say that we have to adjourn here at 1 o'clock. And we are going to have to abide strictly by the three minute time constraint here, I regret very much, because I know many of you have come distances to testify here. We want your whole statements entered into the record, but in the interest of trying to hear everybody and still make it by 1 o'clock, I must ask everybody to cooperate on the time constraints.

Mr. Ellison.

STATEMENT OF BURNS ELLISON, COLUMBIA, NE

Mr. Ellison. Yes. Thank you, Mr. Chairman and the others on the committee, for having us here.

My name is Burns Ellison.

I feel in some measure I have been shot out of the water, as it were, in that I had planned to speak at some length my three to five minutes on my time I spent this summer in Old Crow. But two people from the Yukon, including one person, Howard Linklater, from Old Crow has already spoken. And so, I would say this and make it more brief. And then if there is time remaining, I would like to say something else.

First of all, as an Anglo I wish to speak on behalf of the people of the village of Old Crow. Old Crow is the northern most village in the Yukon Territory and the only Indian village in the Yukon that doesn't have a road to it. Old Crow has a population of between 250 and 300 people.

The people refer to themselves as the Vuntut Gwitchin. The Vuntut Gwitchin are members of the Athabaskan language family which stretches from western Alaska to southern Alberta in Canada and east to Hudson's Bay. The Vuntut Gwitchin of Old Crow belong to the same language family as the Apache and the Navajo in the American southwest.

Old Crow has been an Anglican Church community since 1874. This past summer 76 year old Ellen Bruce of Old Crow became the first native woman in Canada to be ordained as an Anglican priest. Along with their ties to the church, however, the people still retain certain of their tribal beliefs. They have what truly can be termed a spiritual relationship to the land and a kinship with the creatures of the land.

And in light with that, this is something that a Canadian Indian once was quoted as saying in reply to a French priest, which ever since first reading it, it has always stuck in my mind. The Indian says this to the French priest. "This heaven you speak of—is it more beautiful than the country of the musk ox in summer when sometimes the mist blows over the lake and sometimes the water is blue and the loons cry very often?" And the country that I feel that, in effect, that that Canadian Indian was speaking about was the country of the coastal plain of the Arctic National Wildlife Refuge.

The other thing that I would say in the time I have remaining is that—and I would attempt to wing it at this point—is that in 1969

I spent seven months working up on the north slope. I was employed at Sagwa in a bush camp and a sort of jumping-off place to Prudhoe Bay. And then I became the interior Dead Horse Station manager.

And one of the lasting impressions that came away from my time up there is that the people, by and large, were very much estranged to the land, to the environment. They could scarcely be sympathetic, for the most part, to the environment because they looked upon the environment as the enemy. It was something—it was cold. The people there were there under miserable circumstances. They were lonely. Many of them were very self-destructive. They were violent. And I think they were keenly aware in an unconscious level that they were committing a violence to the land.

I think some of you have probably seen the Oliver Stone movie Platoon. Well, I think there is an analogy between what he describes in his movie and what was taking place up there with the difference being, of course, that nobody was shooting at us on the north slope. But there were certain analogies, and one of them was their relationship to the land. In other words, the soldiers in Viet Nam I am sure hated the jungle. It was perceived as an enemy just as people on the north slope for the most part in those oil camps looked upon the tundra, the cold, the mosquitoes, everything else that goes with being up there as an enemy.

[The prepared statement of Mr. Ellison follows:]

TESTIMONY
OF BURNS ELLISON
BEFORE THE
SENATE COMMITTEE
ON
ENERGY AND NATURAL RESOURCES

October 22, 1987

Lenny Kohm, a free-lance photographer from Sonoma, California, and I spent a month this past summer in Alaska, the Yukon and the Northwest Territories of Canada. We went up there to do an article on the Arctic National Wildlife Refuge, and the battle currently taking place over whether or not to open up the Coastal Plain of the ANLR--also known as the 1002 area--to oil exploration and drilling. Lenny Kohm and I drove up the Alaska Highway in his car, we camped along the way. We were not sent up on assignment by "National Geographic," "The Audubon," "Rolling Stone," "Penthouse," or anybody else. We made the trip at our own expense, borrowing every nickel and dime we could get our hands on to do it. We went up there for a number of reasons, some shared, others personal, and along the way we both discovered more reasons. We came back with over 2,000 color slides, 14-hours of taped interviews, and the conviction that as long as this issue is perceived as simply a battle between "elitist environmentalists" and oil companies, or oil companies versus saving the caribou, the oil companies are going to win. We also came back with this sense of urgency, this feeling that it's of the utmost importance that everybody be given the opportunity to know what's at stake here, that this controversy and how it's resolved, has to do with far more than oil companies, ecologists and caribou, that it has to do with, in one way or another, to a greater or lesser degree, all of us.

Before leaving California in early August, Lenny Kohm made numerous phone calls to people in Alaska, one of them to April Crosby, co-Chairperson of the Arctic Audubon in Fairbanks. April mailed Lenny a telephone-book-sized packet of information on the ANWR, including a copy of the Department of Interior's Legislative Environmental Impact Statement (LEIS) and Resource Assessment. She also told Lenny we should contact a bush pilot in Fairbanks named Don Ross about being flown up to the ANLR. Lenny had no sooner done so ~~do~~ then he got a long distance phone call from Ben Beach, an editor with the Wilderness Society. Ben had just talked to Don Ross, and was calling Lenny to discuss the three of us chartering a flight with Don and sharing the expenses.

During the four or five days we were in Fairbanks, April and her husband, Merritt Helfferich (an old friend whom I had not seen in 20 years, since 1967 when I spent a summer in Fairbanks) provided us with a place to stay. April works for the Audubon Society on a volunteer basis, she gives unstintingly of her time and energy, and she was immensely helpful to us in giving us names of people in the Fairbanks area to contact.

Shortly after arriving in Fairbanks, Lenny, Ben Beach, and I made a three-day flight to the ANWR with Don Ross in his 185 Cessna floatplane. Our first day we flew over Prudhoe Bay and made a brief fuel stop there. Afterwards, we made a brief stopover at the Eskimo village of Kaktovik on Barter Island in the ANWR. That night we camped by a small lake on the Coastal Plain. On our second night we camped at Shrader Lake in the Brooks Range, in the center of the ANWR. On day three, we returned to Fairbanks, making a brief stopover along the way in Arctic Village, an Athabaskan Indian village located in the southern part of the ANWR on the Yukon River. Those three days we were in the ANWR coincided with a flurry of activity, occasioned by the comings and goings of U.S. Congressmen, Secretary of the Interior Donald Hodel and his entourage, oil company representatives, and a flock of environmentalists.

After returning to Fairbanks, Lenny and I drove to Dawson City in the Yukon Territory, then halfway up the Dempster Highway to Eagle Plains. From there we flew by North Yukon Air to the Athabaskan Indian village of Old Crow (North Yukon Air, I might add, is a small airline jointly-operated by the village of Old Crow and a Canadian bush pilot named Craig Unterschute). Lenny and I stayed for nine days in Old Crow, camped on the bank of the Porcupine River, in the middle of the village. At the end of our stay we flew back to Eagle Plains where we had left our car. From there we drove north to the end of the Dempster Highway--the only public road in all of Canada and Alaska that crosses the Arctic Circle--to the town of Inuvik in the Northwest Territories. Along the way we made brief stopovers in the Indian villages of Fort McPherson and Arctic Red River.

After three days in Inuvik, we turned around and started back--back to the United States and California. On the way we stopped in Whitehorse, capitol of the Yukon Territory. There we met with Norma Kassi, Member of the Legislative Assembly (MLA) for the Yukon Territory, representing her village of Old Crow. We taped an interview with her in her governmental office, then afterwards she invited us to have lunch at her home in Whitehorse so that she could show us the hour-long video she'd made during the six weeks she spent last spring with her family at Crow Flats. Crow Flats is a sprawling area of ponds and lakes some 30 to 40 miles northeast of Old Crow. People from Old Crow go there every spring to trap muskrats. After we'd had lunch with Norma and her children and had seen her video, Lenny and I got back in his car and drove off, feeling if one journey was over, another was just beginning.

* * * * * * * * *

The preceding is primarily a factual accounting, a matter of record. What I wish to speak of now is for the record. I wish to speak on behalf of the people of the village of Old Crow. Old Crow is the northern-most village in the Yukon Territory and the only Indian village in the Yukon that doesn't have a road to it. Old Crow has a population of between 250 and 300 people, depending on how many of the people are out in the bush, hunting, fishing, or trapping. Given the name Loucheux by early French explorers, which translates into "People of the Slanting Eyes," the people refer to themselves as the Vuntut Gwitchin. The Vuntut Gwitchin are members of the Athabaskan language family, which stretches from western Alaska to southern Alberta in Canada and east to Hudson Bay. The Vuntut Gwitchin of Old Crow belong to the same language family as the Apache and Navajo in the American southwest.

Old Crow is located on the west bank of the Porcupine River, 80 miles north of the Arctic Circle, 120 air miles northwest of the Dempster Highway, and approximately 40 miles east of the Alaskan-Canadian border.

Old Crow has been an Anglican Church community since 1874; this past summer, 76-year-old Ellen Bruce of Old Crow became the first native woman in Canada to be ordained as an Anglican priest. Along with their ties to the church, however, the people still retain certain of their tribal beliefs. They have what truly can be termed a spiritual relationship to the land, and a kinship with the creatures of the land. They live a traditional subsistence way of life, and they are almost entirely dependent upon the 180,000-animal Porcupine caribou herd.

When I say I wish to speak on behalf of the people of Old Crow I realize that smacks of presumption. And indeed it would be presumptious of me to put words in their mouths, or to imagine that I was speaking for the inarticulate. Given the opportunity, the people of Old Crow would speak with far greater eloquence than I. The reason I'm speaking is precisely because they have not been given that opportunity--at least not by the U.S. Senators and Representatives who will be making decisions that could effect the lives of the people of Old Crow, along with half a dozen other native communities in eastern Alaska, the Yukon and the Northwest Territories of Canada, in the most profound and potentially tragic way.

Actually, the people of Old Crow have been given *some* opportunity, it amounts to this much: In August this past summer a small group from Old Crow flew to Arctic Village, Alaska to attend meetings and speak before U.S. Congressmen. They were given fifteen minutes of oral testimony. Alfred Charlie, a village elder from Old Crow, spoke first in his native language. What he said was then translated by Stanley Njootli, one of the members of the Old Crow Band Council. The time it took them was twelve minutes. Norma Kassi got the remaining three minutes. Some archeologists estimate that the people of Old Crow are [redacted] living in a traditional subsistence way of life that dates back 30,000 years. In regard to decisions that could very possibly end this way of life, thus far--or at least to the best of my knowledge--the people of Old Crow have been given fifteen minutes to speak on their own behalf.

* * * * * * * * * *

When Lenny Kohm and I set forth from California, Old Crow was little more than the name of a place on a map to us. Neither of us had any way of knowing then that reaching Old Crow would take on the proportions of a quest. That it did was in some part the result of a phone call made on impulse once we'd gotten to Whitehorse on our way up the Alaska Highway. Sitting in the lounge of the Sheffield Hotel, having a drink and waiting for the night's performance of the Frantic Follies (we'd just been given two free tickets for the show), I tried to call the Yukon Conservation Society, reasoning why not? they might have something to say about what was happening regards ANWR. I spoke to Violet Van Hees, President of the Yukon Conservation Society. Yes, she told me, what the United States was trying to do in the ANWR was of great concern to people in the Yukon. She said she would be glad to talk to us, but that actually the person we *should* talk to was Norma Kassi. She was in Old Crow just then, but if we were coming back through at the end of the month we could contact her then. But it would be much better, she then added, if we could contact her now while she was in Old Crow. Yes, it would make such a difference if we could see Old Crow for ourselves.

Norma Kassi, Old Crow, those names kept popping up. While having dinner in Fairbanks with Niilo and Joan Koponen, her name was mentioned. Niilo, a member of the Alaska Legislature ~~Legislatur~~e, knew her, and thought highly of her, and he too thought we should try to go to Old Crow. After that I called Norma Kassi in Old Crow.

She said yes, come to Old Crow, we would be more than welcome. The caribou were starting to come through, and we might have the chance of going upriver on a caribou hunt.

But Old Crow, the northern Yukon--that was so far off: at the very least we'd probably have to borrow more money. When we flew up to the ANWR with Don Ross, the possibility was raised. But it was ruled out: we didn't have enough time, and it would be too costly for us in terms of the added flying hours it would require.

When we made our brief stopover in Arctic Village, however, we had the chance to meet Norma Kassi. She was in the midst of preparing her written and oral testimony for the following day when U.S. Congressmen would be arriving, and she only time to talk to us briefly. Yes, come to Old Crow, she said, once more extending her invitation, we'd be more than welcome.

I've mentioned the 'flurry of activity' that was taking place while we were in Alaska. Fairbanks...the North Slope...Prudhoe Bay...Kaktovik...Arctic Village: everywhere we went we kept running into the same people. All this sudden attention being given Alaska, and yet, here was this small remote village in the northern Yukon, and it was being virtually ignored.

I've also mentioned 'brief stopovers.' Lenny and I began to have the sense that congressmen and environmentalists--all these people were making 'brief stopovers,' including ourselves. A plane would land in a native village; people would get off the plane, wander around, stare at the villagers, [redacted], shake hands and exchange a few words, take pictures, then an hour later, or two hours, or half a day later, get back on the same plane and fly back to Fairbanks--to California--to Washington D.C.

So what would it be like, Lenny and I asked ourselves, if we got to a place like Old Crow, and we *stayed* for a few days, maybe even a week, maybe even longer?

I think too a conversation with Timothy Sam of Arctic Village had much to do with deciding if we went to Old Crow, we *didn't* want to do it on the basis of a 'brief stopover.' Discovering we'd both been stationed at Fort Ord, California, years before, Timothy Sam and I started out swapping army stories. But that wasn't what was really on his mind just then. With an edge to his voice, he began telling me how much he and the people of Arctic Village were opposed to the Coastal Plain of the ANWR being opened up to oil drilling, how much that would effect the caribou, and change the way of life he and his people had always lived--how much he saw it as "violating our rights." "My 99-year-old grandfather used this land, and we use it now in the same way. We care for the land, and the animals. These people--these congressmen, they arrive and spend two hours. They sit there and ask us questions. We tell them, and they just sit there, like dummies. They don't say anything, then they leave." Shaking with indignation, he then went on to say: "You tell me, how would you feel if I was to come to your home in California? How would you feel if I came and listened to you for two hours, and if I just sat there like a dummy and didn't say anything, and then got back on my plane and came back here to Arctic Village to decide on something that would change your whole life? You tell me, how would you feel?"

* * * * * * * * *

I think it was only appropriate that on the first night Lenny and I arrived in Old Crow we were invited out to a dinner of caribou. Caribou! During the nine days we were in Old Crow, virtually every conversation we had with anybody--regardless of what subject we started out on--wound up having to do with the caribou.

I'd so often read and heard, and observed from personal experience, that in regard to large disputes concerning Indian communities there were always splits and factions and divisions within that community over the issue at hand. Within a community there were always the 'traditionals' and the 'progressives,' the 'activists' and 'militants'; there were those referred to as "apples"--red on the outside, white on the inside. As a result, there's so often that question left at the end of settling a dispute, whether it be over land claims, leasing areas for mining, logging, oil drilling, what have you, of whether the 'People' themselves were ever really given the opportunity to make themselves heard. It was for these reasons that during our stay in Old Crow we tried to talk to everybody who would give us the time of day. We didn't want to leave there, feeling we'd only talked to a selected few of the people, those few who would tell us what we wanted to hear, or those who were telling us what *they* wanted us to hear, as opposed to what still others might wish for us to hear. Thus we not only talked to Norma Kassi, and the village chief, and the members of the Old Crow Band Council, we talked to young people and village elders, we talked to whomever we happened to run into, whoever stopped by our campsite, whoever invited us into their homes to feed us or offer us cups of coffee (we drank *endless* cups of coffee!). There are some 15 to 18 white people living in Old Crow, including the Anglican priest and his wife, a schoolteacher, a corporal and constable of the Royal Canadian Mounted Police stationed there, the Old Crow Recreational Director, the Nursing Station nurse--we talked to as many of them as we had the chance to.

During our nine days in Old Crow we went upriver on caribou hunts, and we spent the better part of one day at the fishing camp of Kenneth Nukon. Kenneth Nukon is 67-years-old, his left arm and leg have been paralyzed since childhood; yet he's the only person in Old Crow who lives alone in the bush on an year around basis. And if Kenneth Nukon's not a shaman, he's the closest thing to one I've ever encountered. He's a holy fool monk-living-in-a-cave sort; he's the merriest of men. "O my goodness me!" he cries, laughing uproariously. Yet quick as a flash he can suddenly turn harsh and stern as a crusty old Zen master. We were introduced to him by Roy Moses, an ex-marine and Vietnam veteran who, after being away from Old Crow since 1964, living 16 years in San Francisco and who by his own admission ~~being~~ was an alcoholic, returned to Old Crow a year ago this past August. He now presides over the A.A. program in Old Crow, counsels troubled kids, and confided to us that when he's at his "wit's end" either goes to see the Anglican priest or upriver to see Kenneth Nukon.

During those nine days we went berry-picking, hung out in Charlie's Cafe, climbed Old Crow Mountain, attended services at the Anglican Church, and hosted a blueberry pancake and bannock breakfast that the chief herself, Alice Frost, attended. In the course of those outings and occasions, we taped 8 to 10 hours of interviews with the people of Old Crow. And in these interviews--and all the other conversations we didn't tape--we were told always, unfailingly, without a single exception, the same thing: the People of Old Crow do not want the Coastal Plain of the Arctic National Wildlife Refuge opened up to oil drilling.

Attuned to the land, the seasons, the weather and elements, the people of Old Crow know on an intuitive, visceral level, if not always on a scientific level, what researchers are increasingly discovering and realizing is happening--and has been happening--in Prudhoe Bay: toxic wastes being dumped and poured onto the tundra, seeping into the permafrost, borne up in the air as black smoke emissions, poisoning the land, the atmosphere--the caribou....

The caribou! and how much the people live and die by the caribou. How much they depend upon the caribou, and how much the caribou means to them, not only as a food source, but in regard to being so integral to the way of life they choose to live.

And the choice is theirs.

Nobody knows for sure how much the Porcupine caribou herd would be effected should the Coastal Plain of the Arctic National Wildlife Refuge be opened up to oil drilling. There are strong indicators; still, nobody knows for sure. Nobody, it seems, knows for sure about anything. It's all a kind of Reagan Roulette in the ANWR. The stakes are high. The problem is, the people of Old Crow--and half a dozen other subsistence native communities--have nothing to gain, and everything to lose.

The caribou! "Without the caribou, these people would die," or such was the opinion expressed by a non-native, Linda Garner, the nurse for the past several years at the Old Crow Nursing Station.

"Without caribou, we're dead," Roy Moses has said, expressing his opinion of what's at stake for his people. "My strong suspicion is that if this development proceeds we will face genocide...They can survive without the oil, but we can't survive without caribou."

Genocide--an ugly word, whether defined in its purest form, or when it takes the form of 'cultural genocide.'

> 'Genocide can be practiced in a variety of ways.
>
> The Desperate People, of whom I wrote in 1952 and 1959, are desperate still. But now they include all the native peoples of Canada--Indian, Eskimo and mixed bloods. They are making what may be their last convulsive effort to achieve survival apart from, and despite, a society which will accept them only if they transform themselves into second-class simulacrums of Western man. They are

> fighting what may well be their ultimate battle to exist in the world according to their own concept of what their lives should be. They are making what is probably their final effort to achieve the freedom to be themselves.'

Farley Mowat wrote the above passage in 1974, in a Forward to the New Edition of PEOPLE OF THE DEER, a book first published in 1951. The people he wrote of were not the people of Old Crow; they were a group of inland Eskimos called the Ihalmiut, who once lived in the Northwest Territories of Canada. Farley Mowat's book is a painful tragic story of a people victimized by misguided governmental policies, by greed, ignorance, and indifference. His book is an epitaph, a chronicle of how when the Ihalmiut ceased to be a 'people of the deer,' they ceased to exist. In drawing a comparison between the Ihalmiut and the Vuntut Gwitchin of Old Crow, there are distinct differences and one distinct similarity. The Ihalmiut lived in igloos, and theirs was a primitive existence. The people of Old Crow live in log cabins. They have telephones, stoves, hot and cold running water; they have TV sets and VCRs, and there's a place in the village where you can rent videos. The people drive pickup trucks, 3-wheeled All Purpose Vehicles, and snowmobiles in the winter. The village has an arcade, a Co-op store, a community hall--the village has street lights. The biggest difference, though, between the two peoples is that while one is gone, the other is still very much with us.

The one distinct similarity between the two peoples is that the Vuntut Gwitchin are also a 'people of the deer.'

Senator **Bumpers**. I have looked over your testimony, and I am really reluctant to cut you off because one of your complaints is Congressman come up there and shake hands and leave.

And I understand that, but your statement is a beautiful about those people. And I'll tell you in just a moment about a visit we had in Kaktovik last summer.

Our next witness is Mr. Hayden.

STATEMENT OF MARTIN B. HAYDEN, DEFIANCE, MO

Mr. **Hayden**. Yes. I want to express my appreciation to this committee for being given the opportunity to express my viewpoint today on the proposal before you to open up the coastal plain of the Arctic National Wildlife Refuge to oil and gas leasing.

I was living in Alaska in 1980 when the Alaskan National Interests Lands Conservation Act was passed. And I feel this legislation showed a great deal of foresight on the part of Congress. Unfortunately, the coastal plain or 1002 area was not designated a wilderness at that time.

I firmly believe that the coastal plain, which has evolved uninterrupted over millions of years, should not be developed, but rather should be declared a wilderness. And I would like to share some of the factors or things I've read that have most influenced my opinion.

First, of that 1100 miles of our arctic coastline that occurs in this country, only 125 miles of it is protected. The majority of that 125 mile segment is the 1002 area. And this is an area which Department of Interior biologists have described as the most biologically productive part of the entire refuge. And it is this critical area which we are being asked to sacrifice today.

Secondly, I'm concerned about the direct impacts of oil and gas development on the coastal plain. Such things as oil spills and hazardous waste from drilling operations containing substances such as lead, magnesium, chromium and arsenic being spilled onto and deposited into the tundra—these activities hardly seem to be compatible with the purposes of a wildlife refuge.

Third, the Secretary of Interior's recommendations were based on what he called a 19 percent probability of finding economically recoverable oil. To me it seems like a fairly low chance of success to sacrifice this area for. But should his mean volume of 3.2 billion barrels be discovered at the $33 price per barrel which is expected, this would mean in the long-term life of the field less than 1 percent of our current annual energy budget that is in excess of $400 billion per year. And in my mind this is not that great of a payoff either.

Fourth, I have to wonder if this proposal is part of some overall energy policy. And if so, what is the role of energy conservation in that policy? Could we not achieve greater results more effectively in less time through the implementation of energy conservation measures? I sincerely hope that the majority of this committee will feel it is not worth sacrificing this most important part of the Arctic Refuge for a short-term and questionable payoff. I urge you to proclaim the coastal plain of the Arctic National Wildlife Refuge a wilderness. We owe the future of this wild place in the Arctic preserved in its natural state for all time.

And I would like to add one more thing. I feel I represent probably the majority of Americans in that I have never been to the coastal plain, and I may never get there. But it just makes good sense to me that an area that is the critical breeding grounds for almost every form of wildlife on the refuge is not separate and not a small part of an 18 million acre refuge, but is the critical core of that refuge and should be included in it as a wilderness. And in my own heart I don't have to be there to find the comfort that I would receive to know that it is preserved for all time. And I hope that this committee will see things the way I do.

Thank you.

[The prepared statement of Mr. Hayden follows:]

Verbal

Testimony of Martin B. Hayden
1988 Callaway Fork Rd.
Defiance, MO. 63341

RE: Senate Energy Committee Hearing on S.1217
22 October 87.

I want to express my appreciation to this committee for giving me the opportunity to present my opinion on the proposal before you to open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas leasing. I was living in Alaska in 1980 when the Alaska National Interest Lands Act passed. I feel this legislation showed great foresight on the part of congress, unfortunately the coastal plain was not designated a wilderness at that time. I firmly believe that the coastal plain, which has evolved uninterupted over millions of years should not be developed but rather should be declaired a wilderness. The factors that most influenced my opinion are:

First, Of our 1100 miles of Arctic coastline all but 125 miles is currently available to oil and gas leasing. The majority of the protected 125 mile segment is the coastal plain of the ANWR, an area which Dept. of Interior biologists describe as the most biologically productive part of the entire refuge, yet it is this crucial portion which we are being asked to sacrifice.

Second, I am very concerned about the direct impacts of oil and gas developement on the coastal plain. Oil spills and hazardous wastes from drilling operations adding lead, manganese,chromium and arsenic through direct spills and injection into the tundra, hardly seem to be compatible with the purposes of a wildlife refuge.

Third, The Secretary of Interior based his recommendation on a 19% probability of finding 3.2B barrels of oil at a market price of $33.00 per barrel. To me that appears to be a low chance of success, but should the mean volume be discovered it would amount to less than 1% of our current annual energy budget of some 400+ Billion dollars over the 30 year field life.

Fourth, I have to wonder if this proposal is part of some overall energy policy, and if so, what is the role of energy conservation in that policy? Could we not achieve greater results, more cost effectively and faster through the implementation of energy conservation measures than by developing new oil fields in the arctic.

I feel that I represent the majority of Americans in that I have never visited ANWR, yet it is very important to me that this place not be developed. I do not have to see it to appreciate its importance. The coastal plain is not a separate part of ANWR, but a very key element which supports the rest of the refuge because it is the breeding grounds for the majority of the wildlife species on the refuge. This is the place where they have and raise their young and store energy for their migrations south, be it shorebirds, waterfowl, or caribou. You cannot make the division between coastal plain, forest and mountains for they are all interrelated and all must be preserved in order to save this last great arctic ecosystem.

I sincerely hope that the majority of this committee will feel that it is not worth sacrificing this most important part of the Arctic National Wildlife Refuge for a short term and questionable pay off. I urge you to proclaim the coastal plain of the Arctic National Wildlife Refuge a wilderness. We owe the future this wild place in the arctic preserved in its natural state for all time.

October 30, 1987

Additional Testimony of Martin B. Hayden
1988 Callaway Fork Rd.
Defiance, MO 63341

There were a couple of points raised at the hearing which I would like to address as part of my testimony.

I. What is the problem with developing the 1002 area while the balance of the refuge, which is many times larger, will not be developed?

The 1002 area cannot simply be considered as a separate part of ANWR. In my opinion, it is the single most important habitat in the entire ANWR ecosystem. I would like to site a few statistics on three species given in the Dept. of Interior final E.I.S. on the coastal plain which highlight the importance of this area.

1. The percentage of cows in the 180,000 member Porcupine Caribou Herd (PCH) which utilized the 1002 area for calving in the last few years-

1983 -- 74%
1984 -- 35% and one week after calving an additionaly 38% moved onto the 1002 area (cum - 73%)
1985 -- 82%
1986 -- 24% and essentially the entire herd moved onto the 1002 after calving (cum - 100%)

Post calving season is the low point of the annual physiological cycle when the energy reserves of the cows are especially low. If denied access to insect relief habitat at this time the herd may stop feeding and herd productivity will be impacted. The 1002 area contains the majority of insect relief habitat for the PCH and it is precisely these cows and their offspring which are most sensitive to the disturbance which development would cause.

2. The Muskox population of ANWR as estimated by Interior would be forced to avoid 71% of their high use year round habitats including calving areas due to oil and gas development, this is listed as an unavoidable impact.

3. An average of 105,000 Lesser Snow Geese utilize the 1002 area every year to stage and build energy reserves prior to fall migration, (maximum usage was 325,760 in 1978). Oil development will unavoidably decrease the habitat value of 162,000 to 236,000 acres of this preferred staging habitat.

In my mind, an area that exhibits such usage by these species can hardly be considered an insignificant part of the entire ANWR.

II. I would also like to address the comparisions raised between Prudhoe Bay and the 1002 area with respect to the caribou population at Prudhoe Bay.

The primary difference between the Central Arctic Caribou Herd (CAH) found in the Prudhoe Bay Region and the PCH in the 1002 area is some 165,000 animals. It is not reasonable to compare the dynamics of a population of animals in which the population size differs by a factor of 12. In addition, according to Interior the CAH has NEVER used Prudhoe Bay for concentrated calving and little or no calving has occurred in the TAPS - Prudhoe area since 1973. The PCH on the otherhand utilizes 78% of the 1002 area for concentrated calving.

Another key difference between 1002 and Prudhoe is the distance between the sea and the mountains, at Prudhoe Bay that distance is some 90 miles, while the 1002 area varies from 18 to 40 miles. So, not only are we looking at more animals utilizing the 1002 area, but also less space for them to avoid the impacts of development. I firmly believe that the development of the coastal plain will have the major impacts and population declines predicted in the Draft E.I.S. not the "no appreciable decline" it was ammended to in the final report.

Points 1 through 4 of original written testimony dated 19 October 87 of Martin B. Hayden for attachment to 22 October 87 testimony as addenda. (22 Oct. Testimony to remain intact)

1) Of our approximately 1100 miles of arctic coastline almost 89% of it is currently available for oil and gas development, while the remaining 125 miles is protected within the ANWR.

According to the Dept. of Interior, the coastal plain area has outstanding wilderness qualities and is the most biologically productive part of the ANWR as well as the center of wildlife activity on the refuge. Yet, it is precisely this last 11% of our arctic coast which the oil industry must have.

2) The Secretary of Interior made his recommendation using oil prices of $33.00 per barrel to achieve the 19% probability of finding any economically recoverable oil. This economic standard appears greatly different from the trend that has been seen in the oil industry over the last few years. In addition, should the 3.2 billion barrel mean volume be indeed discovered, it would at $33.00 per barrel, amount to 3.52 billion dollars a year over the 30 year life of the field. At first this seems like a large figure, except when you compare it to the $400 billion plus which we currently expend annually on energy in this country. So it appears that we are being asked to sacrifice our last protected segment of the arctic coast for less that one percent of our annual energy expenditures.

3) I am concerned about the direct adverse effects on the environment that would be generated through oil and gas production. Alaska's Department of Environmental Conservation (ADEC) has reported that 521 oil spills occurred in Alaska's Arctic Region in 1985 alone. In addition, the Department of Interior has stated that some 17,000 spills have occurred since 1973. In a sampling by ADEC, all but one of the 21 drilling mud reserve pits tested violated effluent standards for arsenic, manganese, chromium, lead and other pollutants. With each well drilled in the Arctic producing some 840,000 gallons of wastes per year, oil and gas production in the coastal plain hardly seems to be compatible with the overall purpose of a wildlife refuge.

4) I have to wonder if this proposal is part of some National Energy Policy, and if so, what is the role of energy conservation in that plan? Is it not more cost effective and faster to implement energy conservation measures than to develop a new oil field in the Arctic? I've heard the statistic that we could save up to $200 billion a year if we were as energy efficient as Western Europe. Does this not appear to be potentially a much larger pay off than the development of the ANWR? National Security and dependence on foreign oil have been held up as banners for ANWR development on one hand, yet we raise the speed limit on our nation's highways, thereby increasing our dependence on the other.

Senator **Bumpers**. Thank you, Mr. Hayden.

Did I get your name right? Is it Mr. Sawtelle?

Mr. **Sawtelle**. Correct.

Senator **Bumpers**. Mr. Sawtelle, you may proceed.

STATEMENT OF ALLAN SAWTELLE, CINCINNATI, OH

Mr. **Sawtelle**. Mr. Chairman and concerned lawmakers, we do appreciate your concern on this matter of importance to all of us.

I am Allan Sawtelle from Cincinnati. My interest in Alaska was whetted when a friend, now an Alaskan, determined that there was a profitable market for used pianos in the Fairbanks area. We bought eight used pianos and a truck in Cincinnati, drove to Fairbanks, where he sold them, leaving me free to experience the area before returning.

I subsequently went back to Alaska without piano accompaniment, thoroughly impressed with the sights, the vastness and the indescribable feel of Alaska, an experience that I want for my children and grandchildren. I only hope that Senator Murkowski and the rest of you who have been there have had the chance to be out in this great expanse and to feel its majesty and the presence of the good Lord in this land with which he has so richly endowed us. It is a birthright that we must pass on to our children for their enjoyment and for the part that it plays in the ecology on which we are all dependent.

We are told by Senator Murkowski and others that we can have our cake and eat it, that we can extract oil without destroying this landscape and its creatures. However, the Interior Department's report acknowledges that oil and gas development would have a major adverse impact on the area's wildlife. Despite all of the care built into the Prudhoe Bay complex, air pollution, oil spills and hazardous waste disposal problems have given us a grim picture of what we may expect.

The oft-cited increase in the caribou herd is irrelevant to 1002. There are different animals with different patterns with a far greater dependence here on this limited ocean front area. I can't speak too well from other caribou, but I would have considerable difficulty bringing my offspring up in the shadow of an oil well.

Sadly, there is much evidence that we have an either/or choice to make.

We must not sell this birthright for a mess of pottage.

I do not mean to under-estimate the seriousness of our dependence on foreign oil by this comparison, but must note that like the pottage or the 19 percent perceived chance of finding it, it will be consumed in a short time and for this time will serve to enhance the appetite of an already overweight patient.

Nor will it be a cheap alternative. The oil, if the 19-percent chance is realized, at $33 per barrel will be nearly in line with synthetic fuels from which support has been withdrawn. Where the staying power is long-term, probability is 100 percent, and where costs may be expected to decrease with time and experience. It is certainly less cost-effective than the conservation measures that are presently in place and which can be enhanced.

The Cincinnati Reds just released their general manager for making trades much less damaging than the trade being considered here.

I strongly urge that we protect our birthright and our long-term energy interests and keep our oil—question mark—in the 1002 underground and the indigenous animals above ground in this great land as God created it.

Thank you.

[The prepared statement of Mr. Sawtelle follows:]

STATEMENT BY ALLAN SAWTELLE BEFORE THE SENATE COMMITTEE ON ENERGY AND Natural resources on S.1217. OCTOBER 22, 1987.

I am Allan Sawtelle from Cincinnati, a retired former manufacturer's representative, machine shop owner and foundry president.

My interest in Alaska was whetted when a friend, now an Alaskan, determined that there was a profitable market for used pianos in the Fairbanks area. We bought 8 used pianos and a truck in Cincinnati, drove to Fairbanks where he sold them, leaving me free to see the area before returning. I subsequently went back without piano accompaniement, thoroughly impressed with the sights, the vastnes and an indescribable "feel" of Alaska; an experience that I want for my children and grandchildren. I only hope that our Senators who have been there have had the chance to be out in this great expanse and to feel its majesty, and the presence of the Good Lord in this land with which he has so richly endowed us. It is a birthright that we must pass on to our children, for their enjoyment and for the part it plays in the ecology, on which we are all dependent.

We are told that we can have our cake and eat it - that we can extract oil without destroying this landscape and its creatures. However, the Interior Department's report acknowledges that oil and gas development would have major adverse impacts on the area's wildlife. Despite all of the care built into the Prudhoe Bay complex; air pollution, oil spills and hazardous waste disposal problems there have given us a grim picture of what we may expect. The oft-cited increase in the caribou herd is irrelevent to 1002 - they are different animals with different living patterns, and far greater dependence on the ocean-front area here. Sadly, there is much evidence that we have an either/or choice to make.

We must not sell this birthright for a mess of pottage.

I do not mean to under-estimate the seriousness of our dependence on foreign oil by this comparison, but must note that, like the pottage, (or the 19%

Statement by Allan Sawtelle, page 2

perceived chance of finding it) it will be consumed in a short time, and for this time will serve to enhance the appetite of an already overweight patient.

Nor will it be a cheap alternative. The oil, if the 19% chance is realized, at $33 per barrel will be nearly in line with synthetic fuels from which support has been withdrawn; and where the staying power is long term, probability is 100%, and where costs may be expected to decrease with time and experience. It is certainly less cost-effective than the conservation measures that are presently in place, and which can be enhanced.

The Cincinnati Reds just released their General Manager for making trades must less damaging than the trade being considered here.

I strongly urge that we protect our birthright and our long term energy interests and keep our oil (?) in the 1002 underground and the indigenous animals above ground in this great land, as God created it.

Senator **Bumpers**. Thank you, Mr. Sawtelle.

And gentlemen, thank all of you very much for coming here. As you probably know, you're preaching to the saved when you are testifying before me. Unhappily, all the committee members don't agree with us on this, and that's the reason we are holding these hearings. Otherwise, it wouldn't be necessary.

Mr. Sawtelle, Senator Metzenbaum asked me specifically to be remembered to you.

Mr. **Sawtelle**. Thank you.

Senator **Bumpers**. I am sure that you can count on his support in your position on this.

Mr. **Sawtelle**. Thank you.

Senator **Bumpers**. Thank you very much, gentlemen. Our next panel is Mr. John Blake of Hebron, Connecticut; Ernest Dickerman, Swoope, Virginia; Anthony Pilawski, Sierra Club, Bordentown, New Jersey; and Robert Lee Smith—is it New Paltz, New York?

Mr. Blake.

STATEMENT OF JOHN S. BLAKE, HEBRON, CT

Mr. **Blake**. Mr. Chairman, thank you for the opportunity to come before you with my personal feelings and thoughts on ANWR.

I have not been to the coastal plain of ANWR. But wilderness and the sound that it brings brings deep heartfelt emotions from those people that have come to know its true meaning which is life, life created by the Creator for its own benefit and for its own happiness, separate but yet interdependent with another. There is a harmonious contingent balance on its biological welfare that is a harmony of one extends to all the others. This is the natural cycle of life to which we are all a part of and to which our very existence depends on.

This cycle of life is no more evident in America today than in the Arctic National Wildlife Refuge. Unlike other wilderness in America this natural balance has not been disturbed by the presence of man. ANWR is America's last and only ecosystem and the last arctic ecosystem in its natural pristine state left in the world. This ecosystem is the final link between North America and the continent's genesis whereby I feel that all flora and fauna that exist today existed in the beginning of time. Nothing has changed. I think from a natural heritage point of view, this is without question the greatest natural statement that we as Americans can make about our natural heritage.

The 1.5 million acre coastal plain is a triumph of treasured public lands. There is not one place in America that supports such a diverse wildlife and migratory waterfowl population as the coastal plain of ANWR. This wilderness plain is home to many arctic species, such as the arctic fox, grizzly and polar bears, the endangered musk oxen, the 180,000 caribou herd, which is the largest free-roaming herd of any kind in America, and millions of migratory birds.

If I could try to put this in perspective to what the birthright of this means to a lot of Americans, two years ago when I was in

Europe, I found their opinions to be very jealous of our national public lands that we have still in their natural, pristine state. I found that their feelings of crowded space was something that they wished they did not have to endure. However, when I left, they gave me one very strong message: Don't lose it.

Alaska's arctic coast is 1100 miles long. One thousand miles has already been leased by the oil industry. With the exception of Prudhoe Bay, no significant finds of petroleum have been found. To imply that the remaining 100 miles of the arctic coast will solve America's problems is unlikely.

I find that if America will lose all the remaining 100 miles of its arctic coast, what does that say about us as being a great and mighty industrial nation if we must sacrifice one of its treasured jewels for the benefit of a six month oil supply?

I am outraged that we would lose our remaining 10 percent of arctic lands that we as all Americans own for the benefit of such a short, terminal supply.

My personal occupation is dealing with bottled ground water, and in that every time it rains, our spring fills up with water. And we are able to use this as a resource. However, on the coastal plain I find this as being just a source. Once it is tapped, depleted, it is gone forever. And the finality of this is something I think that we as Americans in our natural birthright cannot accept.

Thank you very much.

[The prepared statement of Mr. Blake follows:]

October 18, 1987

Dear Senate Energy Committee:

Wilderness! The very sound of the word brings deep heart felt emotions to the surface in every American that has come to know its true meaning...and that meaning is life, both plant and animal created for its own benefit and happiness. Each forms an unbroken chain, separate yet interdependent with another. This natural balance is so contingent on its biological welfare that the harmony of one extends to all others. This is the natural cycle of life to which we are all a part of and to which our very existance depends on.

This cycle of life is no more evident in America today than in the Arctic National Wildlife Refuge. Unlike other wilderness in America this natural balance has not been disturbed by the presence of man. ANWR is America's last and only ecosystem and the last arctic ecosystem in its natural pristine state left in the world. This ecosystem is the final link between North America and the Continents Genesis. All that rome free in the beginning of time still roams free today. This in itself makes ANWR biologically unique and the last of its kind. This is also the grandest statement that we as American's can make about our treasured National Heritage. A heritage that is a natural birthright of all future american generations.

The 1.5 million acre coastal plain is the triumph of treasured public lands. There is not one place in America that supports such a diverse wildlife and migratory water fowl population as the coastal plain of ANWR. This wilderness plain is home to many arctic species such as the arctic fox, grizzly and polar bears, the endangered musk oxen, the 180,000 caribou herd, which is the largest free roaming herd of any kind left in America and millions of migratory birds.

At issue in all this, is the possibility of oil and gas depostis under the coastal plain. After a five year study by the U.S. Department of Interior, to determine the potential of oil and gas development and the effect it would have on wildlife and all resources of the entire ecosystem. Interior Secretary Donald Hodel announced the result of that study last November. Their recommendation was to open up the entire coastal plain for oil and gas leasing despite their own findings as follows: only a 19% chance of any recoverable oil and gas deposits exist under the best of circumstances assuming that domestic oil prices are $33.00 a barrel. A 19% find would project 3.2 billion barrels which at current U.S. energy consumption rates would yield a six month supply of energy or 4% of the entire U.S. energy picture.

Alaska's arctic coast is 1100 miles long, 1000 miles (90%) has already been leased by the oil industry. With the exception of Prudhoe Bay, no significant finds of petroleum have been found. To imply that the remaining 100 miles (10%) of the arctic coast will solve America's energy needs is very unlikely.

At recent congressional hearings, Hodel himself admitted that the coastal plain would not have the ability to make the country any less energy dependent. The report also admits that oil exploration and development would cause irrepairable damage to wildlife habitat that the refuge was established to protect. Population declines would effect all species including up to a 40% loss in the porcupine caribou herd (72,000), a 50% decline in the snow goose poplulation (162,000), the entire wolf population which is already endangered would become extinct, the endangered polar bear and musk oxen would follow the way of the wolf as well. The report also states that water is in short supply in ANWR and with each drill site 16 million gallons of fresh water must be used. Interior left this resource problem in the hands of the oil industry. In other words, we only have their word on how water will be developed. There is little doubt that the shallow lakes and the small rivers which dry up in the summer, would have to be dredged along with strip mining river banks in order to divert water to the gravel pits.

The oil industry points to Prudhoe Bay as an example of harmoneous arctic drilling with both the landscape and wildlife but closer examination reveals this to be untrue. Since 1973 the industry has reported more than 17,000 oil spills. In 1985 alone the oil companies reported 521 oil spills. With the inevitable side effect of oil development, the industry has been cited with eleven different hazardous and toxic waste violations. Also, the oil activity around Prudhoe Bay has released 74,000 tons of nitrogen oxides into the air. This amounts to nearly 40% of the air pollution generated by New York City, our largest.

The claim that the caribou herd mingles with pipelines is also distorted. The central caribou herd in the Prudhoe area is much different from the porcupine herd on the coastal plain. The central herd has adapted to the Prudhoe area because one: they do not calve in the area, whereby disturbance is less of a factor. Two: the north slope of the Brooks range is further set back than on the coastal plain which enables the smaller central herd to avoid disturbed areas. Three: all of the central herd predators- the wolf packs, grizzly and polar bears, have either been shot or driven out of the Prudhoe area completely. The coastal plain has been termed the "American Serengeti" because of 180,000 porcupine herd which is the largest free roaming herd in the western hemisphere. These caribou have nowhere else to calve except the coastal plain, nor do they have the room that the central herd has because of the mountains coming down to within 100 miles of the Beaufort sea. This explains the 40% loss anticipated in the Interior report.

Since 1981 the administration has slashed funding for conservation and renewable energy sources. The roll back of auto efficiency standards from 27.5 mpg to 26 mpg is estimated to cost the U.S. 400,000 barrels of oil a day. This more than offsets the projected daily output of 290,000 barrels from the coastal plain. If, however, we adopted a conservation energy policy to search out alternative renewable energy resources, instead of a "drain America first" approach, we would then not only meet our present energy needs but our future needs as well.

Destroying one of America's greatest natural jewels for a six month supply of oil, does not speak well of this country as a mighty independent nation. As Americans, we would not allow the damming of the Grand Canyon for its hydropower. Nor would we allow the capping of Old Faithful for its geothermal energy. So should we not allow America's greatest refuge to be lost to the gain of so few against the loss of so many.

Sincerely,

John S. Blake

John S. Blake
Hebron, Connecticut

Senator BUMPERS. Thank you very much, Mr. Blake.
Mr. Dickerman.

STATEMENT OF ERNEST M. DICKERMAN, SWOOPE, VA

Mr. DICKERMAN. My name is Ernest Dickerman living near Buffalo Gap in the Allegheny Mountains of Virginia. Thank you, Chairman Bumpers, for this opportunity to express my opinions on this controversial issue.

The paragraph 4 of the written statement indicates the background and experience spread over some 50 years in environmental action from which I approach consideration of this coastal plains issue.

I would like to read verbatim paragraph 5 because that is the heart of my testimony.

As indicated in the opening paragraph of this statement, I am strongly in favor of giving the protection of the Wilderness Act to the entire coastal plain of the arctic refuge. Why? The special values of this essentially unspoiled, undisturbed natural area are many. They are truly irreplaceable if upset by man and his works. We need to preserve and protect significant and substantial areas on this planet in their unaltered natural condition for such purposes as ecological, scientific, educational, scenic, recreational, historical and conservation. We need to keep the pure air, the clean water, the undisturbed wildlife habitat, the haven for threatened and endangered species of plants and animals, the opportunity for bold adventure, and in the case of this Arctic Refuge coastal plain, the means of subsistence livelihood and culture of native peoples both in Alaska and in adjacent Canada.

It well may be that our increasing scientific study of wild nature, its products and processes will be the supreme value derived from wilderness preservation through the understanding gained of how best to maintain a healthful, productive environment despite our ever-growing urban and industrial way of life, how to restore it to health and productivity, damaged environments in a world of ever-increasing population density and through the discovery and application of presently unfamiliar plants and organisms to create needed new chemicals and medicines.

Earlier in this hearing, Senator Murkowski expressed a view which I would appreciate expressing a different view. He suggested that one thought about the reality of this situation with respect to the arctic coastal plain. Rather, I would say the reality is that we have known, great natural values in the coastal plain as it is. Whereas, with respect to the oil, any values are highly speculative whether there is any value of oil, any quantities of oil or not is totally uncertain.

I suggest it is far wiser to keep these great natural values of the refuge which we know we have rather than risking them for the unknown, speculative values of possible oil which is available elsewhere in Alaska and in the lower 48 and which will be of relatively short availability in any case.

In concluding I would like to say that as citizens and owners of a coastal plain, we intend to exert ourselves in every legitimate way to win the protection of the Wilderness Act for the coastal plain of the Arctic Refuge to assure keeping a great and abundant spiritual, scientific and lifegiving benefits to humankind of this great natural treasure.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Dickerman follows:]

STATEMENT OF ERNEST M. DICKERMAN RE S. 1217, ARCTIC REFUGE COASTAL PLAIN LEASING BILL, BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, AT WASHINGTON, D.C., OCTOBER 22, 1987.

1. My name is Ernest M. Dickerman, address Rt. 1, Box 156, Swoope, Virginia 24479, telephone (703) 337-8000. I am testifying today as a private individual in opposition to S. 1217 and in support of placing the 1.5 million acre coastal plain of the Arctic National Wildlife Refuge in the National Wilderness Preservation System.

2. Thank you, Senator Bennett Johnston and Members of the Committee on Energy and Natural Resources, for the opportunity to appear before you and to express my views on this highly controversial issue of whether the coastal plain of the Arctic Refuge should be opened for drilling and production of oil and gas.

3. Over the past thirty years the citizens of the United States have shown sharply increasing concern for the condition of the physical environment of this planet Earth, upon which we are all dependent for a continuing healthful and productive way of life. The Congress has reflected this concern by the creation of numerous committees and subcommittees having jurisdiction over various aspects of the environment. We have reached the point in our national thinking where we recognize that to maintain our high standard of living in America we must treat the environment with care and discrimination in our commercial and industrial operations and in our personal practices.

4. On a personal note, let me say that for over fifty years I have been actively involved in concern for the environment, dating back to the early 1930's. Public lands, meaning principally national parks, national forests and national wildlife refuges, have been my main interest, with special time and effort given to protection of wildlands of outstanding quality. To a greater or less degree, I have actively participated in such conservation battles as Echo Park Dam in Dinosaur National Monument; the eight-year campaign to secure passage of the Wilderness Act of 1964; the Great Smoky Mountains National Park proposed transmountain road fight and ever since in the campaign to win wilderness designation for most of that Park; the big Alaska lands issues culminating in the 1971 ANCSA and 1980 ANILCA acts; national forest management legislation in the mid-1970's; promoting numerous wilderness proposals locally and before Congress; and in recent years wrestling with the U.S. Forest Service about national forest management plans. Most of this work has been done as an unpaid volunteer and involved encouraging individuals and their citizen organizations to seek enactment of appropriate legislation to win their conservation objectives. However, for ten years I was a salaried member of the Wilderness Society staff. Upon retirement in 1976 I returned to carrying on the same sort of environmental activity as an unpaid volunteer in Virginia.

5. As indicated in the opening paragraph of this statement, I am strongly in favor of giving the protection of the Wilderness Act to the entire coastal plain of the Arctic Refuge. Why? The special values of this essentially unspoiled, undisturbed natural area are many. They are truly irreplaceable if upset by man and his works. We need to re-

serve and protect significant and substantial areas on this planet in their unaltered natural condition, for such purposes as ecological, scientific, educational, scenic, recreational, historical and conservation. We need to keep the pure air, the clean water, the undisturbed wildlife habitat, the haven for threatened and endangered species of plants and animals, the opportunity for bold adventure, and in the case of this Arctic Refuge coastal plain the means of subsistence livelihood and culture of native peoples both in Alaska and in adjacent Canada. It well may be that our increasing scientific study of wild nature, its products and processes, will be the supreme value derived from wilderness preservation--thru the understanding gained of how best to maintain a healthful, productive environment despite our ever-growing urban and industrial way of life, how to restore to health and productivity damaged environments in a world of ever-increasing population density, and thru the discovery and application of presently unfamiliar plants and organisms to create needed new medicines and chemicals.

6. While some of these purposes and values are available outside of designated wilderness, there is no assurance that unprotected areas will exist tomorrow. Steadily, in one way or another, we consume what yesterday was wildland, whether park, forest, wildlife refuge or other intended natural reservation. It is the application of the Wilderness Act which brings the assurance that the natural values of an area which we have today will continue to be ours tomorrow and for generations to come. Recognized both by opponents and proponents, giving the protection of the Wilderness Act to the 1.5 million acres of the Arctic Refuge coastal plain by placing it in the National Wilderness Preservation System is the most positive assurance, within human limits, that its extraordinary natural values will prevail indefinitely for the benefit of humankind.

7. Whether any economically recoverable oil will be found under the coastal plain is highly speculative--as is true of all oil exploration. May be oil will be found, may be it won't. Alaska wildcatters know this only too well. Exploration by drilling, whether or not followed by production, would severely impair the natural conditions of the coastal plain and its known benefits. Miles of road built up of gravel, numerous drill pads scattered thru the area likewise resting on piled up gravel, construction of landing fields for airplanes, mining of huge quantities of gravel from stream beds and elsewhere, extraction of millions of gallons daily of the limited supply of fresh water from rivers and ponds, disposal of toxic drill wastes, all will inevitably disrupt extensively the ecology and character of the area--even when done only for exploration. There are millions of acres in arctic Alaska and elsewhere in the state, onshore and offshore, open for oil exploration and development. Granted the finite quantity of oil beneath the United States, we do not need to drill in the coastal plain now nor in the foreseeable future. Any oil not drilled now will still be in the ground come some future day. But the wilderness values will be wiped out forever as soon as exploration and production drilling begin. Let's be wise, drill elsewhere, and keep intact the known wilderness values of the Arctic Refuge coastal plain.

8. In conclusion, as citizens and owners of the land, I and many Americans will exert ourselves in every legitimate way to protect

and preserve the undisturbed, wild, natural character of the 1.5 million acre coastal plain of the Arctic National Wildlife Refuge. We will exert ourselves to assure keeping the full spiritual, scientific and life-giving benefits to humankind of this great natural treasure.

Thank you, Senator Johnston and Members of the Committee.

Ernest M. Dickerman
Rt. 1, Box 156
Swoope VA 24479
(703) 337-8000

Senator **Bumpers**. Thank you very much for a beautiful statement.

Mr. Pilawski?

Senator **Bradley**. Mr. Chairman, if I could——

Senator **Bumpers**. Yes, I notice he is from New Jersey.

Senator **Bradley** [continuing]. I would like just to welcome Mr. Pilawski to the committee and call special attention to his testimony, particularly the section of the testimony that points to the relevance of the New Jersey Pinelands to the question that the committee is hearing testimony on today. So, welcome.

Senator **Bumpers**. Thank you, Senator Bradley.

Mr. Pilawski, you may proceed.

STATEMENT OF ANTHONY S. PILAWSKI, SIERRA CLUB, BORDENTOWN, NJ

Mr. **Pilawski**. Yes. My name is Tony Pilawski, and I am from Bordentown, New Jersey. It is an honor to appear before the committee today to express my concern over the proposed development of the coastal plain of the Arctic National Wildlife Refuge. Particularly, I wish to state my opposition to Senator Murkowski's bill or any bill which would open the coastal plain to oil and gas leasing or development.

Too many people are seeing this in too simplified light: oil versus caribou. The 180,000 porcupine caribou herd is important, but we must recognize that it is an ecosystem which includes not only organisms but also the several non-living components of the environment within which the organisms are found. Most importantly perhaps it represents all the interactions that bind the living and non-living components into a stable system. It is this wilderness environment of which we speak, the wholeness, the entirety of the coastal plain and of the larger 19 million acre Arctic National Wildlife Refuge of which the coastal plain is the ecological heart. This is the issue. What cannot be mitigated is the wilderness value, and any oil development is not compatible with wilderness.

Thus, the question becomes can we as a nation justify destroying our only remaining arctic wilderness. When we look into the probabilities and the mean estimates, I think the answer seems clear.

A cheaper, quicker and less environmentally damaging way to save as much oil would be to raise the mile per gallon efficiency on automobiles by just a couple miles per gallon. Only a long-term, rational energy policy emphasizing energy conservation and development of more economical and less environmentally damaging alternative energy sources can free us from being held hostage to oil.

For comparison, I would like to turn your attention to the New Jersey Pinelands Protection Act which was adopted in 1980. This established the Pinelands Preservation Area to preserve what was left of a unique and self-maintaining ecosystem that had evolved over thousands of years to protect it from development pressure. There was a conflict. Quoting from the New Jersey Pinelands Comprehensive Management Plan, "Sand, gravel, and other mineral resources are important pinelands values which can provide economic benefit to landowners. However, it is critical that such activities do not conflict with other values of the pine lands." Thus, section

6-603 states: "No new resource extraction operations shall be permitted in the preservation area."

In New Jersey a choice was made though it was too late to save the whole since many species had already been eradicated. In Alaska we are now facing a similar choice, but on a much larger scale of importance. Our Nation's arctic coastline stretches 1100 miles; 125 miles remain. Nearly all of it has been included in the 1002 area proposed for oil leasing.

I commend Senator Bradley for your stand that you have taken on wilderness whose destruction cannot be mitigated. We in the New Jersey Sierra Club express our deepest appreciation for your stand and for the role you have taken as a leader.

Below ground there may or may not be oil. But the wilderness values are known. However much mitigation is attempted, introducing industrial development into the coastal plain destroys not only the acres directly involved, but the sanctity and integrity of the wilderness whole of the Arctic.

I urge passage of legislation, specifically S. 1804 introduced by the Honorable Senator Bill Bradley of New Jersey, to designate this national treasure as wilderness.

Thank you.

[The prepared statement of Mr. Pilawski follows:]

PREPARED STATEMENT OF: Anthony S. Pilawski
Bordentown, New Jersey

BEFORE THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
October 22, 1987

Mr. Chairman, it is an honor to appear before the Committee today to express my concern over the proposed development of the coastal plain of the Arctic National Wildlife Refuge. Particularly, I wish to state my opposition to Senator Murkowski's Bill (S. 1217), or any Bill which would open the coastal plain to oil and gas leasing or development.

The Arctic National Wildlife Refuge is the last undisturbed ecosystem of its kind, thus, it is uniquely important in both its size and scope of the wilderness values it holds and the wildlife values it protects. In the world there is no other place quite like it. It is a complete arctic ecosystem of international significance, of which the coastal plain is the ecological heart.

Too many people are seeing this in an all to simplified light, oil vs. caribou. The 180,000 Porcupine caribou herd is important, but so are the polar bears and musk oxen, the wolves and foxes, the hundreds of species of birds and migratory waterfowl. So are the people who depend on this wildlife for subsistence, and so are the land, air, and water upon which all life of this extremely fragile and special place depend.

The picture I am trying to paint is of an ecosystem. The last ecosystem of its kind. An ecosystem which includes not only organisms, but also the several nonliving components of the environment within which the organisms are found. Most importantly, perhaps, it includes all the interactions that bind the living and nonliving components together into a stable system. It is this wilderness environment, the wholeness and entirety of the natural world, of the coastal plain and of the larger 19 million acre Arctic National Wildlife Refuge, of which the coastal plain is so integral a part, which is the issue. What cannot be mitigated is the loss of wilderness-- and oil development (any oil development) is simply incompatible with wilderness.

Thus, the question becomes: Can we as a nation justify destroying our only remaining arctic wilderness ecosystem?

Justification for the Interior Department's proposal to allow oil and gas development stems from an understandable concern in regard to our nation's increasing dependence on foreign sources of oil. However, when we look into the "probabilities" and "mean estimates" of finding oil under the coastal plain, the answer to this question becomes clear.

The Department of the Interior tells us that the chance of finding oil is 19%, based on a price of oil over $30 per barrel. Furthermore, even if they do find oil in the coastal plain (a one in five chance), at peak production it would provide less than 5 percent of our energy needs (assuming a mean estimate of 3.2 billion barrels). Over the 30 year life of its production potential, the coastal plain would produce less than 2 percent of our energy needs, or 290,000 barrels per day. A cheaper, quicker, and less environmentally damaging way to get that much oil would be to raise the U.S. auto fleet efficiency by two miles per gallon.

Improved energy efficiency is the fastest and least expensive means of reducing dependence on foreign oil. The energy efficiency of the U.S. energy economy has improved by 24 percent since 1973, saving the equivalent of 4 billion barrels of oil in 1987 alone. Energy efficiency improvements that have occurred so far only scratch at the potential that now exists. Refrigerators, air conditioners, lights, and buildings can be powered at a fraction of their current energy requirements. Without energy policy reforms, the efficiency potential will not be realized, and the United States will depend far more heavily on oil imports and pay far higher energy bills than is necessary.

So what is the answer to the question I posed? The proposal to open the coastal plain for oil exploration cannot be justified as a solution to the country's energy problems, but is a dangerous diversion from the more effective energy policy initiatives that are now needed.

The Department of Interior has recommended full leasing without evaluating more economical and less environmentally damaging ways of resolving our energy problems, including further efforts at energy conservation. Only a long-term rational energy policy, emphasizing energy conservation and development of alternative sources can free us from being held hostage to oil. Destruction of our last arctic wilderness would be a poor trade-off for what is estimated as a 19 percent chance of finding oil.

Below ground, there may or may not be oil, but the wilderness value is known. The Department of Interior states "The coastal plain has outstanding wilderness qualities: scenic vistas, varied wildlife, excellent opportunities for solitude, recreational challenges, and scientific and historic values." However much mitigation is attempted, introducing industrial development into the coastal plain destroys not only the acres directly involved, but the sanctity and integrity of the wilderness whole of the Arctic Refuge.

In New Jersey, we have a place called the Pinelands. Many people would not call the short scrubby pines which grow there beautiful, but yet, we have chosen to protect this area through passage of the Pinelands Protection Act. There were those who fought passage of this Act because of the enormous development potential of the area. Fortunately, the unique and intrinsic value of the Pinelands was recognized and the area will be preserved for future generations to share.

In Alaska, our nation's arctic coastline stretches, in its entirety, 1100 miles across the Alaskan north slope. Only 125 miles of the coastline remains as a protected ecosystem-- the coastal plain of the Arctic National Wildlife Refuge. Nearly all of the coastal plain is included in the 1002 area proposed for oil leasing by the Interior Department.

Over the years, we have come to appreciate the relief from congestion and development the Pinelands offers, thanks to the forethought of our State Legislature. I can't imagine New Jersey without the Pinelands. If we would have given into the demands of the developers, or listened to their economic arguments, who knows the value of what we all would have lost by the destruction of the Pinelands ecosystem, a unique place future generations would never have known.

In Alaska, we are now facing a similar choice, but on a much larger magnitude of importance. The Department of Interior Report admits that oil exploration and development would cause irreparable damage to the wildlife habitat. The result would be significant population declines in several species the refuge was established to protect. The wide open vistas of the plain, with the Brooks Range to the south and the glimmering ice pack to the north, would be obstructed by oil rigs,pipelines, pumping stations, and housing facilities. The tundra would be damaged by a maze of roads, powerlines, and runways. Needless to say the Refuge and the wilderness value would be gone.

In the world there is no other wilderness quite like it. This is the last of the Alaskan arctic coastline not yet open to oil development. We owe it to our grandchildren, but also to the entire world, to take seriously our responsibility to be good stewards of our land, our air, and our water, and all the life that depends on it.

The coastal plain is one of America's most beautiful and remote wildernesses. I urge legislation to designate this national treasure as wilderness, and to form a badly needed national energy policy.

Senator **Bumpers**. Thank you very much. We all owe a debt of gratitude to you and all the other people, especially Senator Bradley, for all the work you have done on the Pinelands. We are proud of it and appreciate your allusions to the analogy between the Pinelands and the ANWR area.

Mr. Smith.

STATEMENT OF ROBERT L. SMITH, NEW PALTZ, NY

Mr. **Smith**. Mr. Chairman, members of the committee, I live in New Paltz, New York, a little town in the Hudson Valley, and I am employed there as a school social worker.

I have come to testify today because I believe very, very strongly that the entire Arctic National Wildlife Refuge, including the arctic coastal plain, the 1002 area, should be preserved as total wilderness with no development of any kind. In particular, I urge that S. 1217 be rejected.

My belief in wilderness protection for the wildlife refuge is based on my own personal observations during a 10 day trip to the wildlife refuge in July 1986 as a member of a wilderness field studies course from the University of Alaska at Fairbanks. We had a lot of the same opportunities to observe the marvelous wildlife there as it has been described so eloquently by previous speakers here this morning. We flew into the Lake Schrader area and spent our time backpacking, camping, and watching caribou in that area.

I have been to many wilderness areas and national parks in the United States and Alaska, but in no other area have I ever experienced anything like that wilderness experience, such a sense of involvement in an enormous unchanged wilderness with its ecosystem unaltered and intact. All of the predators are there. The huge streaming herd of caribou is there, followed by the grizzlies and the wolves with polar bears on the coast, musk oxen and a large, healthy, intact, undisturbed population of wildlife.

I also had the opportunity to drive up towards the refuge on the Dalton Highway, the so-called north slope haul road, and I saw the kind of road and pipeline that would be built into the refuge. And I feel that one thing is absolutely clear, that development of the refuge in that way would totally destroy its wilderness quality.

I think some of our good common sense is clouded by the fact that the refuge is so far away. I believe that if you proposed this for any of our other well-known national parks, that people would immediately realize that it is a proposal to destroy the park. If you said we would like to put in 100 miles of oil pipeline, 280 miles of road, 11 oil production facilities, four air strips, 60 permanent drill pads, 15 borrow sites for gravel and 25 major stream crossings, I think people would know that that is a proposal to destroy a national park or a wilderness area.

Then if I could just add one personal note on energy conservation. I'm not an expert, but I recently replaced my own old gas guzzling four-wheel drive, 3 ton truck, and I think I did so because I was influenced by this battle to save the refuge. I bought a new car that gets about 26 miles per gallon.

And I am really flabbergasted that we are proposing to sacrifice a national treasure like this. And there is no one on TV saying please don't force us to do this. Please try to save our resources. We are all the victims of waste of petroleum. There is no sense of national urgency about this. I think if we were proposing to start cutting the wood in the Adirondack forest preserve, or for that matter, cap the Old Faithful geyser for the heat, we would feel embarrassed, and we would try to do something about our terrible waste of energy.

Thank you very much.

[The prepared statement of Mr. Smith follows:]

TESTIMONY FOR SENATE ENERGY COMMITTEE 10-22-87

My name is Robert L. Smith. I reside in New Paltz, New York, where I am employed as a Social Worker for the local school district. I have come to testify today because I believe very, very strongly that the entire Arctic National Wildlife Refuge including the 1002 Area of the Arctic Coastal Plain should be preserved as total wilderness with no development of any kind whatsoever. In particular, I urge you to reject S. 1217.

My belief in complete wilderness protection for the entire 1002 Area is based upon my personal observations made during a ten day trip to the Arctic National Wildlife Refuge in July 1986 as a participant in a Wilderness Field Study Course of the University of Alaska at Fairbanks. Our study group flew in by float plane to Lake Schrader and spent ten days in that area backpacking, camping, and studying wildlife ecology. We observed the movements and behavior of several hundred caribou of the Porcupine herd grazing on the rolling green tundra hills to the North. We caught sight of a wolverine and a grizzly, fished for Arctic Char and Lake Trout, and climbed up onto the shoulder of Mt. Chamberlain to gaze out over the distant Arctic Coastal Plain toward the Arctic Sea. In all directions from that high vantage point we saw no signs of man: no trails, no roads, no manmade structures. Although I have visited many national parks and wilderness areas in the lower 48 States and Alaska, in no other area have I had such sense of involvement in an enormous, unchanged wilderness with its ecosystem unaltered and intact.

As our study group walked over the tundra, we crossed the trails made by caribou in their wanderings. We found the hindquarters of a caribou calf killed by predators. We discovered the remains of a caribou's foreleg gnawed by wolves or possibly a grizzly. We had the most vivid sense possible of contact with a totally wild world that has remained unchanged for thousands of years . Whether the wildlife would survive the introduction of a major oil development complex into such a pristine area I cannot say with certainty; I can say without any doubt whatsoever that oil development will destroy forever the untouched wilderness quality of the area. Today in the lower 48, even the memory of the Great Plains of yesterday is a source of inspiration and national pride for our people: we stop beside an Interstate Highway crossing the Middle West, gaze at a few buffalo huddled behind a fence, and read a plaque describing the majesty of the now vanished scene that the first settlers viewed as they came West. In Alaska, we still have the chance to preserve a Northern Great Plains with its streaming herds of wildlife intact and its wilderness unchanged. Future generations of Americans will be able to come to the Refuge and view a wilderness which has not lost its original greatness. They will not be forced to pull off a highway, stare at caribou grazing around an oil drilling pad, attempt to disregard the noise of a pumping station , read a plaque, and try to reconstruct in their imagination what the original scene must have looked like.

The Arctic National Wildlife Refuge is a great national treasure. Unfortunately, due to its great remoteness, we fail to react with the same good common sense that would come naturally if development were proposed for one of our well known and beloved National Parks in the Lower 48. Can anyone name a single National Park where we could install 100 miles of oil pipeline, 280 miles of roads, 11 oil production facilities, 4 airstrips, 60 permanent drill pads, 15 borrow sites for gravel, and 25 major stream crossings without destroying the natural beauty of the Park? Would the people of New York believe for one moment that we could drop such a complex into the Adirondacks just north of Lake Placid "in a careful and environmentally sound manner" as the Secretary of the Interior claims can be done in the Arctic Refuge? If such a proposal were made for Yellowstone, Yosemite, the Everglades, or Glacier National Park, the true import of the plan would be clear immediately: it is a proposal to sacrifice an irreplaceable national treasure for a few months supply of oil.

It impresses me as especially foolish and short-sighted that a great nation such as ours should propose to sacrifice such a area at precisely the time when we are making so little real effort to conserve energy. I believe that the Senate Committee has already had ample testimony on this issue. Much more energy could be saved by conservation measures than we could ever hope to gain from the Arctic Wildlife Refuge. As a private citizen who is not an energy expert I would like only to report my own personal experience to you. Recently I had to make a decision about retaining my old gas-guzzling automobile or buy a new one. My old vehicle is a three ton, four wheel drive truck that gets 15 miles per gallon at best, and tends to average about 12 miles per gallon overall. Certainly there was a temptation to keep it: it is big, roomy, and feels safe due to its massive weight. I am a skier, and it is convenient to have such a vehicle that can plow through 18 inches of snow. Like many other Americans, I could think of many reasons why I should keep and repair my beloved old gas-guzzler. I decided instead to purchase a new, light four wheel drive car that is getting 25 to 27 miles to the gallon in its fuel consumption. As I made my decision, I heard no appeals from our national leadership pleading with our citizens to conserve oil. There is absolutely no sigificant effort to make Americans aware that waste of petroleum is not a victimless crime: we are in fact all victims of this thirst for petroleum. Perhaps we would feel more embarassment if we were about to cap the Old Faithful geyser and drain off the hot water for heat. Simply because the Arctic Refuge is far off and remote, we don't have to face the fact that we are beginning to destroy our natural heritage to satisfy our thirst for oil. As I drive down our New York State Thruway these days, I am flabbergasted at the number of vehicles that roar past me doing 65 to 70 miles per hour. Many of these vehicles also are, of course, fuel inefficient relics of the 1970's: lumbering old station wagons, rusty pick-ups, big four wheel drive Broncos, Blazers, and Scouts with oversize tires. We are energy big spenders, just like a private citizen big spender who is selling the family heirlooms to pay off credit card bills run up in high price restaurants.

Our citizens are being badly misled by the campaign to picture the Arctic Refuge Coastal Plain as an American Saudi Arabia. In the proposed legislation before you, S.1217, it is stated: "reports prepared by the Department of the Interior and other Federal, State, and private groups clearly indicate that the public lands within the Coastal Plain constitute the most outstanding oil and gas prospect in the United States, onshore or offshore, with potential reserves in place estimated to be from 4.8 to 29.4 billion barrels of crude oil." This rosy forecast glosses over the details found in the Department of Interior's Final Report and Arctic Coastal Plain Resource Assessment of April 1987. No one in the current administration is highlighting the more unpleasant facts contained in the same report: that there is only a 19% chance that there will be any economically recoverable oil under the Coastal Plain, that it's potential contribution to total U.S. oil demand will never be more than 4% (based on the mean conditional recoverable oil estimate of 3.2 billion barrels), that by the year 2010 we will be importing more than half of the oil we consume and that oil from the Refuge would reduce this dependence by a mere 4.9 percent. Having seen the Refuge with my own eyes, I am appalled that we are considering the sacrifice of a unique wilderness for such trivial, temporary,and misleading short-term economic advantage.

Finally, since there has been much discussion of the impact of development on the Porcupine Caribou Herd, I would like to comment on my own observations in this regard. When our small group of backpackers encountered two caribou cows and their calves, the animals appeared extremely nervous and uncomfortable in our presence even at a distance of a quarter of a mile. They rapidly left the area and vanished out of sight. My own observations thus lead me to believe that the conclusion of the majority of caribou biologists is precisely correct: development in the core calving area of the herd will mean displacement of the animals to inferior habitat.

It is ironic,in my opinion, that the Buffalo, an animal which we have exterminated from most of its historic range by hunting and development, is today the symbol of our Department of Interior. I urge that we not inflict the same fate on the Porcupine Caribou Herd and its wilderness homeland. S.1217 should be rejected. The 1002 Coastal Plain area of the Arctic National Wildlife Refuge should receive complete wilderness protection as an inviolable wildlife sanctuary.

Submitted by: Robert L. Smith,

4 Bonticouview Drive, New Paltz, NY 12561

Senator **Bumpers**. Thank you, Mr. Smith. I recommend that you contact Senator Wyche Fowler who did that same 10 day backpack up the Hula Hula River to the Brooks Range and got wet. And as you know, there ain't no way to get dry once you get wet. And he thought he was going to die, but in any event——

[Laughter.]

Mr. **Smith**. It is pretty cool up there even in July.

Senator **Bumpers**. He still thinks it was the greatest experience he ever had in his life. He lost about 10 pounds. And it is a remarkable sight. We were up there, and I tried to talk him out of doing it because he had never done it before. And you know, you don't gather firewood up there to dry your clothes out at night.

But in any event, I was interested in the experience you had and the way you described it.

Gentlemen, thank you all very much for being with us today.

Mr. **Pilawski**. Thank you.

Senator **Bumpers**. Our next panel is Christopher Flavin, Senior Researcher, Worldwatch Institute; Cynthia Wilson, Friends of the Earth; John Helfrich, Sierra Club, Champaign, Illinois; Stephen McCarthy, Portland, Oregon.

Is it Flavin? Mr. Flavin?

Mr. **Flavin**. Flavin, yes.

Senator **Bumpers**. Yes.

Mr. **Flavin**. Thank you.

Senator **Bumpers**. Please feel free to proceed, Mr. Flavin. Go ahead.

STATEMENT OF CHRISTOPHER FLAVIN, SENIOR RESEARCHER, WORLDWATCH INSTITUTE

Mr. **Flavin**. Thank you very much, Mr. Chairman. It's a pleasure to have the opportunity to testify here today.

I am concerned that much of the Nation's media and perhaps some members of this body are beginning to believe that the proposal by the Secretary of the Interior to open up the Arctic National Wildlife Refuge for oil exploration is a solution to the country's energy problems. I will argue that this plan is in fact a dangerous diversion from the more effctive energy policy initiatives that are now needed.

The Department of the Interior's own figures show that there is only a 19-percent chance that economically exploitable oil will be found in the refuge and that the mid-range estimate of available oil comes to only 3.2 billion barrels. During the 30 years of the field, average production would come to about 290,000 per day or 1.8 percent of U.S. oil consumption.

This is a significant amount of oil, but its development would at best delay by less than 1 year the major energy adjustment the United States must make during the coming decades. It is worth noting that in 1986 alone U.S. oil imports rose by a million barrels per day or over three times the projected contribution if exploitable oil should be found in the refuge.

Further increases in U.S. oil imports are, as the Department of the Interior points out, almost guaranteed in the years ahead.

Trying to stem this tide with Arctic Refuge oil is like trying to stop a major fire with a teacup.

Congress should reject the Interior Department's proposal pending preparation of an adequate national energy policy plan by the Department of Energy and its integration into Interior Department policymaking. In the unlikely event that it shows that the Arctic National Wildlife Refuge is the best way to reduce oil import dependence in the future, that oil will still be in place. However, in all likelihood we will find more economical and less environmentally damaging ways of resolving our energy problems and so be able to preserve this valuable part of our national heritage.

If the oil companies should get lucky and find about 3 billion barrels of oil in the refuge, how would this alter the U.S. energy outlook? The Interior Department's report calls attention to the fact that this figure is more than 10 percent of U.S. proven oil reserves. However, this conclusion reflects not the oil riches of the refuge, but the meager oil exploration prospects now remaining in the United States. Indeed, the U.S. consumes this much oil now every seven months. A discovery of 3 billion barrels of oil would add far less than 1 percent to worldwide ultimately recoverable oil reserves. This is an important figure because it is the overall world supply-demand balance that will determine when the next major round of oil price increases occurs.

One of the most useful ways to evaluate the contribution of 3 billion barrels of oil is to estimate its potential to offset the projected declines in U.S. oil production in the coming years. Without a drastic price increase, U.S. oil production is likely to fall at a rate of up to a half million barrels per day each year which would lower oil production by 4 million barrels a day by 1995 and 6 and a half million barrels a day in the year 2000. If 3 billion barrels of oil is extracted over 30 years as projected by the Interior Department and production will average 290,000 barrels per day, this is little more than half the annual decline in production now occurring and would restore less than 5 percent of the annual production that the U.S. is projected to lose by the turn of the century.

The role of energy efficiency in maintaining the economic health of oil importing countries has been recognized in a 1987 report of the Paris-based International Energy Agency and even in the Reagan Administration's 1985 National Energy Policy Plan. Unfortunately, the Department of the Interior appears to have read neither of these important documents. The energy conservation section of its report consists of five short paragraphs that mention the benefits of efficiency but do not seriously consider it as an alternative.

There are, in fact, a range of energy efficiency programs that Congress and the administration could enact to meet comparable or far greater oil needs than can be met by developing the Arctic Refuge. The single largest potential is clearly in energy efficiency or conservation.

Senator BUMPERS. Mr. Flavin, I am most reluctant to ever cut a witness off, but as I stated earlier, we are going to have to stay on a timetable in order to get out of here by 1 o'clock. Your full statement, of course, will be inserted in the record.

Mr. FLAVIN. Okay. Thank you.

Senator **Bumpers**. I did not have a statement from you prior to your appearance here, but I assume you have a formal statement.

Mr. **Flavin**. I do.

Senator **Bumpers**. It will be entered in the record.

[The prepared statement of Mr. Flavin follows:]

THE ARCTIC NATIONAL WILDLIFE REFUGE AND THE U.S. OIL PROBLEM
ALTERNATIVES TO THE DEPARTMENT OF THE INTERIOR'S PROPOSAL

Testimony Submitted By

Christopher Flavin

Senior Researcher, Worldwatch Institute

Before the Committee on Energy and Natural Resources

United States Senate

October 22, 1987

SUMMARY

The proposal by the Secretary of the Interior to open up the Arctic National Wildlife Refuge for oil exploration is not a solution to the country's energy problems but a dangerous diversion from the more effective energy policy initiatives that are now needed. The Department of the Interior's own figures show that there is only a 19 percent chance that economically exploitable oil will be found in the Refuge and that the mid-range estimate of available oil comes to only 3.2 billion barrels. During the 30-year life of the field, average production would come to about 290,000 barrels per day or 1.8 percent of U.S. oil consumption.

This is a significant amount of oil, but its development would at best delay by less than a year the major energy adjustments that the United States must make during the coming decades. It is worth noting that in 1986 alone, U.S. oil imports rose by one million barrels per day or over three times the projected contribution if exploitable oil should be found in the Refuge. Further increases in U.S. oil imports are, as the Department of the Interior points out, almost guaranteed in the years ahead. Trying to stem this tide with Arctic Refuge oil is like trying to stop a major fire with a teacup.

The most serious weakness of the Department of the Interior's proposal is its failure to assess Alaska's oil potential in the context of "the national need for additional domestic sources of oil and gas," as required by Congress in the Alaska National Interest Lands Conservation Act of 1980. Such an assessment logically requires a weighing of the full range of alternative strategies to avoid oil import dependence.

Evidence from other studies show that accelerated programs to encourage investment in energy efficiency can reduce oil imports with more assurance, more quickly, and at far lower cost than by exploring for additional speculative oil reserves in Alaska. Yet at no point in the report does the Interior Department adequately address this option, violating the spirit if not the letter of the 1980 Act. Indeed, there is something pathetic about a great nation, the world's first oil producer, desperately sucking oil out of a national treasure in order to maintain wasteful practices that our industrial competitors are quickly abandoning.

The Department of the Interior's report reflects a broader failure by the Reagan Administration and by Congress to develop a fully integrated energy strategy against which proposals like the current one can be considered. Piecemeal proposals and selective policy options run the risk of avoiding the real issues at hand and thus delaying the substantial energy adjustments that the United States must make to compete effectively in the more competitive world economy of the nineties.

Congress should reject the Interior Department's proposal pending preparation of an adequate National Energy Policy Plan by the Department of Energy and its integration into Interior Department policymaking. In the unlikely event that it shows that the Arctic National Wildlife Refuge is the best way to reduce oil import dependence in the future, that oil will still be in place. However, in all likelihood we will find more economical and less environmentally damaging ways of resolving our energy problems and so be able to preserve this valuable part of our national heritage.

THE U.S. OIL OUTLOOK

There is a growing national consensus that current U.S. energy trends are unsustainable and that major adjustments are required. In the 21 months since oil prices began to collapse, U.S. oil production has fallen steeply, consumption has risen, and import dependence has grown. The American Petroleum Institute, the National Petroleum Council, and the U.S. Department of Energy have all released major studies that point with alarm to these trends and argue that U.S. economic health and national security will be threatened by the forces now at work.

A study published in April by the Fund for Renewable Energy and the Environment, written by Denis Hayes, James MacKenzie, and myself, echoes these basic conclusions but argues that the problem is more fundamental than the oil industry seems ready to acknowledge. In brief, The Oil Rollercoaster shows that U.S. oil production is set to decline at a record pace, a fact that is largely ordained by geology and can only be slightly delayed by expensive efforts to prop up the oil industry.

As the world's pioneering oil producer, the United States has already heavily exploited its oil reserves and has a reserves to production ratio of just 9 years, far lower than the 100-plus years available to most Persian Gulf producers. Far from being a victim of world oil market fluctuations, the U.S. oil industry benefited from the OPEC-led price increases of the seventies. These high prices temporarily misled U.S. oil producers into thinking they could still compete with low-cost Middle Eastern oil.

The heavy investments that subsequently went into U.S. oil exploration temporarily delayed the decline in production that began in 1971. However, even when prices were at their zenith, U.S. oil production in the lower 48 states was 20 percent below its peak level. Meanwhile, oil from Alaska's North Slope, which temporarily compensated for declines elsewhere, has peaked and is projected by the Interior Department to begin declining next year.

There is an inevitability to the ongoing decline in U.S. oil production. Interior Department figures show that of the country's 13 largest oil fields, 7 are at least 80 percent depleted. As finding oil in the United States has become more difficult, the amount of oil discovered per foot of exploratory well has fallen to less than half the rate that prevailed in the early seventies. As oil becomes more difficult to find and extract, average U.S. oil extraction costs have reached at least five times those in the Middle East. The U.S. industry can no longer compete at the world price.

The 800,000 barrel per day decline in U.S. oil production in 1986 was the steepest ever recorded, but it was only a preview of what is to come. The Department of Energy's Energy Security study projects that U.S. crude oil production will fall from 7.2 million barrels per day in 1985 to between 4.1 and 5.3 million barrels per day in 1995 at crude oil prices of between $15 and $22 per barrel. This combined with declines in Alaskan production and in natural gas liquids could increase U.S. oil imports by 4 million barrels per day, even assuming no increases in consumption. This would make the United States dependent on imports for up to 60 percent of its petroleum, far above the 27 percent level of 1985 or even with the 43 percent dependence of 1979.

These projections indicate that the time has come when the United States can no longer assume that its abundant, low-cost energy resource base will be an engine of economic growth and substitute for other weaknesses in the economy. Indeed, in the future the U.S. energy picture will grow more like that of Europe and Japan, which generally lack cheap domestic energy sources and yet have been able to develop economies that function well in a high energy cost environment. Improved energy efficiency and renewable energy sources are the key to making this transition. Unfortunately, realization of the need to make this transition has been slow in coming, and many promising programs have been slashed by the Reagan Administration and Congress.

ARCTIC REFUGE OIL IN PERSPECTIVE

The Department of the Interior's proposal to open up the Arctic National Wildlife Refuge to oil drilling is flawed by its failure to come to grips with the quite limited potential the proposal offers to resolve U.S. energy problems. In particular, the estimated 81 percent chance that the Refuge will provide no exploitable oil is largely disregarded in the ensuing analysis, and most of the attention is focused on the mid-range estimate of 3.2 billion barrels of reserves _if_ exploitable oil is found.

While damage to the ecology of the Refuge is virtually guaranteed, the Interior Department's own figures show that the chances are heavily against finding even the relatively modest amounts of oil that might be present. It is worth noting that in the recent past oil companies have estimated much higher success rates for Alaska and offshore oil projects, invested hundreds of millions of dollars in their development, and come up completely dry.

If the oil companies should get lucky and find about 3.2 billion barrels of oil in the Arctic Refuge, how would this alter the U.S. energy outlook? The Interior Department's report calls attention to the fact that this figure is more than 10 percent of U.S. proven oil reserves and states that, "the 1002 area is currently the unexplored area in the United States with the greatest potential to contain giant and supergiant fields." This statement reflects not the oil riches of the Refuge but the meager oil exploration prospects now remaining in the United States. Indeed, the United States consumes this much oil every seven months.

A discovery of 3.2 billion barrels of oil would add far less than one percent to worldwide ultimately recoverable oil resources. This is an important figure because it is the overall world supply/demand balance that will determine when the next major round of price increases occur. When demand for OPEC oil reaches 80-90 percent of its productive capacity, prices could rise dramatically at any time. Such a situation appears likely to occur 5-10 years from now, and its onset will not be appreciably affected by the small amounts of Arctic National Wildlife Refuge oil.

The Department of the Interior also focuses at some length on the presumed economic benefits of 3.2 billion barrels of oil, estimated at $79.4 billion (undiscounted). This figure looks impressive, but the United States currently has an annual energy bill of over $400 billion; these revenues spread over a 30-year period would be less than one percent of the annual national energy bill. Moreover, ANWR oil would still have to be paid for by consumers; the benefits to the economy and job creation would be limited.

One of the most useful ways to evaluate the contribution of 3.2 billion barrels of oil is to estimate its potential to offset the projected declines in U.S. oil production in the coming years. Without a drastic price increase, U.S. oil production is likely to fall at a rate of up to 500,000 barrels per day each year, which would lower production by 4 million barrels per day by 1995 and by 6.5 million barrels per day in the year 2000. If 3.2 billion barrels of oil is extracted over 30 years as projected by the Interior Department, then production will average 290,000 barrels per day. This is little more than half the annual decline in production now occurring and would restore less than 5 percent of the annual production that the U.S. is projected to lose by the turn of the century.

STRATEGIES FOR REDUCING U.S OIL IMPORT DEPENDENCE

It is clear from the Department of the Interior's own figures that even in the unlikely event that oil is extracted from the Arctic Refuge, this "success" would have an almost inperceptible impact on the U.S. energy situation. U.S. oil import dependence would at best be lowered by a few percentage points for a limited period of time. The potential environmental costs of exploring for Arctic Refuge oil must be weighed against these highly speculative and at best quite limited "benefits."

If the goal is to reduce oil import dependence, and Arctic Refuge oil is being weighed on that basis, then it is essential to evaluate alternative strategies for achieving that goal. Unfortunately, the Interior Department appears to have failed to carry out that responsibility.

Recent experience and numerous analytical studies show clearly that improved energy efficiency is the fastest and least expensive means of reducing dependence on foreign oil. The energy efficiency of the U.S. energy economy has improved by a staggering 24 percent since 1973, saving the equivalent of 4 billion barrels of oil in 1987 alone, or 11 million barrels per day. This is 38 times the potential annual contribution from ANWR, and many studies indicate that energy efficiency's contribution could be doubled to the equivalent of more than 20 million barrels of oil per day by 2000.

Energy efficiency improvements that have occurred so far only scratch at the potential that now exists due to the development of new energy-efficient technologies. Refrigerators, air conditioners, lights, and buildings can all be powered at a fraction of their current energy requirements. The past decade's efficiency improvements were largely driven by high energy prices which have since fallen. Moreover, the government has yet to seriously address most of the market imperfections that still cause considerable underinvestment in energy efficiency. Without energy policy reforms, the efficiency potential will not be realized, and the United States will continue to depend heavily on imported oil.

The role of energy efficiency in maintaining the economic health of oil-importing countries has been recognized in a 1987 report of the Paris-based International Energy Agency, and in the Reagan Administration's 1985 National Energy Policy Plan. That Plan says that energy efficiency "has proven to be the most expeditious way to reduce the need for new or imported energy resources, and in fact it now contributes more to balancing our national energy ledger than does any single fuel source."

The Department of the Interior appears to have read neither of these important documents. The "energy conservation" section of its 206-page ANWR report consists of 5 short paragraphs that mention the benefits of efficiency but do not seriously consider it as an alternative to the Arctic Refuge proposal. This is a critical failure and violates the congressional intent to have the Department of the Interior consider the full scope of national energy needs before making a recommendation on oil exploration.

If the United States is to avoid crippling energy bills and to remain competitive with other industrial countries, it is essential that we choose least cost energy options as we plan for the future. However, this is impossible if environmentally costly proposals like the Arctic Refuge plan are considered in ignorance of far cheaper and less risky options.

There are a range of energy efficiency programs that Congress and the Administration could enact to meet comparable or far greater oil needs than can be met by developing the Arctic National Wildlife Refuge. The single largest potential is in transportation -- which now uses about two-thirds of

U.S. oil. The efficiency of the U.S. automobile fleet now averages about 18 miles per gallon, and continues to increase slowly as more efficient cars developed in the early eighties replace the less efficient ones on the road. However, the Administration has slowed down this progress by relaxing new car standards from 27.5 miles per gallon as mandated by Congress to just 26 miles per gallon. Other countries, particularly Japan, continue to make progress on the automotive efficiency front, and the U.S. still has one of the world's least efficient automobile fleets.

A one mile per gallon improvement in U.S. automobile and light truck fleet efficiency saves 5.9 billion gallons of gasoline each year or about 420,000 barrels of crude oil per day, 45 percent more than the projected annual contribution from the Refuge. Automotive efficiency improvements that have occurred since 1973 are now saving 2.8 million barrels of oil per day. Moreover, an improvement in automobile efficiency will save oil indefinitely, whereas the Arctic Refuge is projected to have a limited 30-year lifespan.

If the United States is serious about reducing oil import dependence, a national program should be started to improve automobile fleet efficiency from the current 18 miles per gallon to 40 miles per gallon by the year 2000. This would save 4 million barrels of oil per day, yielding the equivalent of the projected 30-year Arctic Refuge reserves in just over 2 years.

There are many other ways in which oil and other energy sources can be saved at very low cost. Raising the energy efficiency of buildings, improving lighting efficiency, and further improvements in industrial processes all offer the potential to save millions of barrels of oil at far less than the cost of any new sources of energy supply. Although this fact is being recognized by a growing number of government studies, energy efficiency programs continue to be neglected, and policymakers seem ignorant of the many barriers to efficiency that still pervade the U.S. economy.

The greater than 50 percent cut in federal energy efficiency programs since the early eighties has been a particular blow as has been the rollback of automobile fuel efficiency standards and the failure to set new goals for the nineties. The enactment of appliance efficiency standards early this year is one bright exception to a generally sad story. Given current trends, the United States will still be wasting large amounts of energy at the turn of the century, and is likely to lag even further behind the efficiency levels of Europe, Japan, and even some developing countries.

CONCLUSION

The proposal to open up the Arctic National Wildlife Refuge for oil exploration cannot be justified given the state of national energy policy in this country. Neither the Department of Energy nor the Department of the Interior have seriously evaluated the potential of programs which preliminary data indicate have real potential to reduce U.S. oil dependence. The United States is now drifting into another series of energy crises, but these will be crises of our own making.

It is particularly discouraging to see the Administration calling for further cuts in the energy conservation budget at the same time that it is proclaiming a new oil crisis and calling for development of the Arctic Refuge. Ironically, the Senate is now considering legislation that would allow the President to take emergency and probably damaging measures as soon as oil import dependence reaches 50 percent. This is stopgap planning of the worst sort. We can virtually guarantee that without adjustments we will reach that level within a few years, and the only way to avoid such a crisis is to develop a sound energy strategy today.

Focusing political energy on such diversionary projects as the Arctic Refuge does real damage to the national effort to develop workable solutions to our energy problems. It is high time that the lessons of the past decade be taken seriously and that an effective national energy strategy be developed so that different options can be fairly weighed. Since preliminary evidence indicates that a program of energy efficiency improvements is the best way of reducing oil imports, any attempt to sacrifice the Arctic National Oil Refuge to the national energy appetite should await the completion of a more satisfactory energy assessment.

Senator **Bumpers**. Ms. Wilson.

STATEMENT OF CYNTHIA E. WILSON, EXECUTIVE DIRECTOR, FRIENDS OF THE EARTH

Ms. **Wilson**. Mr. Chairman and members of the committee, my name is Cynthia Wilson. I am the Executive Director of Friends of the Earth, a national environmental organization which has been actively concerned with the fate of the Arctic Refuge for many years.

We strongly oppose S. 1217 which would open up the refuge to development, and we support the Bradley-Roth bill which would designate the coastal plain as wilderness. We believe it would be a serious mistake to open the refuge to development both because of the damage it would inflict, but also because it would postpone facing up to our Nation's need for a national energy policy, including a commitment to energy conservation.

During the Carter Administration as Assistant to Interior Secretary Cecil Andrus, I coordinated the Department's role on aspects of the Alaska National Interest Lands legislation which, as you know, was enacted in 1980. As you will remember, the Interior Department went through an intensive decision making process on all of the Alaska issues in 1977 before making its recommendations to the Congress and ultimately, after very serious consideration, Secretary Andrus and President Carter recommended that the arctic range be designated wilderness.

That decision was not made lightly. It was made during a time when the memory of oil shortages in 1973 and 1974 were fresh, a time when the administration and Congress were making a serious effort to look at the long range picture and find ways to conserve energy. The fact that petroleum is a finite resource was recognized as was the fact that using petroleum for fuel inefficient automobiles is not necessarily the highest and best use of this resource.

By advocating every drop of oil as fast as possible, the Reagan Administration and the oil industry are trying to mask the fact that they are accelerating the day of ultimate depletion. A good steward should be considering ways to conserve the resource, not use it up as fast as possible.

The administration and the industry keep telling us that they can minimize the impacts of development in ANWR and take care of any problems that might occur. Trust us, they say. Back in July we had a perfect example of the ability of the industry to live up to these promises. As you will see by that clipping I passed out, an oil spill of 125,000 gallons in Cook Inlet forced a shutdown of the seafood harvest. Even though the industry had been planning for many years what to do about oil spills, when one occurred, they were unable to deal with it and finally the Coast Guard had to take over. I think this demonstrates just how poorly man is able to deal with the consequences of his actions when they affect complex natural systems.

The ability of government to write and enforce environmental stipulations is limited at best, but in the hands of an administration whose fundamental philosophy is opposed to regulation, how much protection can we really expect? As the nursery rhyme put it, "All the king's horses and all the king's men couldn't put Humpty Dumpty back together again," we don't think you can put ANWR back together again either if we develop it.

I submit to you that the Interior Department would have recommended development no matter what the consequences, and that Congress is going to have to ask the real questions in order to make a wise decision. Since the Reagan Administration has no energy policy other than exploitation for profit, I hope that the Congress will seriously examine the broader issues as well as the true environmental impacts.

In the mid-1970s following the Arab oil embargo, the oil industry insisted that national security required that a gas pipeline be constructed from Prudhoe Bay across the arctic range through this coastal plain. It was not a good idea and that was defeated we think for the same reasons that this proposal to open up ANWR now should be defeated.

I thank you for your time.

[The prepared statement of Ms. Wilson follows:]

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Testimony on S. 1217 and S. 1504
concerning the Arctic National Wildlife Refuge

Presented to the
Senate Committee on Energy and Natural Resources
October 22, 1987

Mr. Chairman and Members of the Committee:

My name is Cynthia E. Wilson. I am the Executive Director of Friends of the Earth, a national environmental organization which has been actively concerned with the fate of the Arctic National Wildlife Refuge for many years. FOE was a founding member of the Alaska Coalition. We strongly oppose S. 1217 which would open up the Refuge's coastal plain to development; we support S. 1504 which would designate the area as wilderness. We believe it would be a serious mistake to open the Refuge to development both because of the damage which it would inflict, and because it would postpone facing up to our nation's need for a national energy policy including a commitment to energy conservation.

I have spent much of my career working to protect this crown jewel of our nation's wildlife refuge system. In the early 1970's, as the Washington representative of the National Audubon Society, I worked on both the issue of the TAPS pipeline and the later proposal to run a gas pipeline across the Arctic Range, as it was then called.

During the Carter Administration, as Assistant to Interior Secretary Cecil D. Andrus, I coordinated the Department's role on all aspects of the Alaska National Interest Lands legislation (ANILCA), which finally enacted in 1980. In my years at Interior, I had a great deal of experience with both the substance of this issue as well as the bureaucratic decision-making process.

As those of you who were on this Committee then will recall, in 1977 the Interior Department went through an intensive decision-making process on all of the Alaska issues before making its recommendations to the President and ultimately the Congress. Of all of the conservation units and related issues which were included in the Alaska legislation, the Arctic Wildlife Range received the most attention and was thoroughly debated.

Committed to the preservation, restoration, and rational use of the ecosphere

After careful consideration of all the available information from the Geological Survey, the Fish and Wildlife Service, the State of Alaska, Native leaders, the Federal State Land Use Planning Commission, the Government of Canada, private industry, conservation groups and others about the potential for oil and gas and the impacts which exploration and development might have on the Refuge's diverse and magnificent wildlife, wilderness values and Native peoples, in 1977 Secretary Andrus and President Carter made a firm decision to recommend that the entire Arctic Range be designated as wilderness.

That decision was not made lightly. It was made during a time when the memory of oil shortages in 1973-74 was fresh, a time when the Administration and the Congress were making a serious effort to look at the long-range picture and find ways to conserve energy. The fact that petroleum is a finite resource was recognized, as was the fact that using petroleum as fuel for inefficient automobiles is not necessarily the highest and best use of this resource.

By advocating drilling every drop of oil as fast as possible, the Reagan Administration and the oil industry are trying to mask the fact that they are accelerating the day of ultimate depletion. A good steward should be considering ways to conserve the resource, not use it up as fast as possible.

In the unlikely chance that 3.2 billion barrels are recovered from ANWR, that equals only a 194 day supply at our present rate of consumption. Even if it were a year's supply, that does not make it worth destroying the most biologically productive part of this premier wilderness area. For that reason, Secretary Andrus and President Carter stuck to their recommendation of wilderness in the refuge and strongly advocated energy conservation and supported research on alternative energy sources. They also advocated careful development of the outer continental shelf as part of a balanced energy program.

During the four-year debate on the legislation, the Geological Survey produced two reports on the potential for oil in ANWR based on existing information. The 1978 report concluded that ANWR is more likely to have a number of medium to large oil and gas accumulations than a "supergiant" one (such as Prudhoe Bay). The 1980 report said that if oil was discovered there was a 95% chance that there are 0.16 billion barrels in place and a 5 percent chance of 17 billion barrels in place, and a 50% chance of 2.7 billion barrels in place. The appraisal pointed out that generally about one third of oil in place is actually recovered, but USGS scientists speculated that only about 20 to 25% of any oil discovered in the Range might actually be recovered because it may be heavier than conventional crude oil. No estimates were made of the probability of discovering oil and gas.

(Interestingly, a similar appraisal of the National Petroleum Reserve in Alaska said there was a 50% chance of a 5.2 billion barrels in place. Despite a massive exploration program in NPRA, of course, there still has been no major find there.)

All of this information was considered by the Congress, and the House twice passed a bill which designated ANWR as wilderness. The House vote in 1979 occurred at a time when spot oil shortages caused the reappearance of long gas lines. To its credit, the House stood firm. However, the Senate did not agree, and the 1002 study was the result.

The draft 1002 report says "there is a 95 percent chance the 1002 area contains more than 4.8 billion barrels of oil ...and a 5 percent chance that it contains more than 29.4 billion barrels," and these figures have been widely publicized. However, as energy expert Amory Lovins pointed out in his critique of the draft 1002 report,

> "Only an unusually careful reader would note that all of the stated probabilities of finding various amounts of oil, and obtaining various economic benefits, are fivefold too high. This is because all of the probabilities are 'conditional' on there being any economically recoverable oil in area 1002 at all, and the probability of that occurence is estimated at 0.19. Thus, the overall probability of finding 1.0 billion economically recoverable barrels is only 15%; the overall probability of a very large (9.2 recoverable bbl) reserve would be only 1%; and the probability that 'the estimated [mean-case] 3.2 bbl of recoverable oil would be foregone' under Alternative E is not unity but 0.19, there being an 81% probability that wilderness designation would actually forego no benefit whatsoever, but only costs. Yet the Executive Summary nowhere mentions this fivefold exaggeration of the probabilities which the reader is invited to infer. Such a consistent relegation of this fivefold factor to technical fine print leaves an unfortunate impression of dishonesty."

The Reagan administration tells us we must exploit ANWR because of declining supplies and national security, yet the 1002 report does not even consider conservation as an alternative. President Reagan opposed the bill setting appliance efficiency standards, supported raising the speed limit and has cut the federal budget for research and development on conservation, efficiency and alternative fuel sources by 91%. To add insult to injury, President Reagan graphically demonstrated his disdain for alternative sources of energy by having the solar panels removed from the White House.

The Reagan Administration has squandered an opportunity to set the nation on a path toward reasonable natural resources policy. Facing a worldwide glut of oil, the Administration had the chance to pause in the headlong rush to drill America first, at any cost. We could have begun to think about balancing the various values that are at stake. We could have established our basic values and goals with regard to wilderness, wildlife and energy conservation and supply. Instead, under Reagan, Watt and Hodel, that opportunity appears to be lost.

Since then-Secretary Watt attempted to lease the entire outer continental shelf in one massive, ill considered program, it has been clear that this Administration is--to put it bluntly--in bed with the oil industry and has neither comprehension nor concern for the kind of values which wilderness and wildlife represent. So it came as no surprise to us when Secretary Hodel announced that the Administration had decided to recommend full-scale leasing of the 1002 area.

The real reason for opening up ANWR to development is greed, pure and simple. It will be extremely profitable for the oil companies to get bargain leases now when the price of oil is depressed, so that when and if in the future any economically recoverable oil is found, they can make a killing at the taxpayers expense. This is the same tactic Watt and Hodel used with coal leases, and now Secretary Hodel wants to do the same thing with ANWR. Everyone recognizes that oil prices will rise again, and the economic viability of leasing is premised on higher prices. Yet, do you think Interior will charge the oil companies accordingly? Don't bet on it. This follows the pattern set by this Administration: flood the market at depressed prices to transfer the public's resources to the private sector. Naturally the industry wants this issue decided while prices are low.

The one thing that was a surprise about the recommendation was Secretary Hodel's assertion at his press conference that the statement in the draft 1002 report that, "These changes in habitat availability and value, combined with increased harvest, could result in a major population decline and change in distribution of 20-40% (of the Porcupine caribou herd)...." was an editing error. Who does he think he's kidding?

Having worked in the Interior Department, I know how many people scrutinize and "sur-name" even relatively routine documents, and when an issue as highly controversial as this one is being considered, the level of review becomes even more intense. Since the potential for damage to the caribou herd is one of the most widely publicized issues in this debate, it is simply unbelievable that an editing error such as this could have slipped through. And I've never heard anyone accuse Secretary Hodel of being a poor manager.

This debate is really about national energy policy and national values. However, this statement would be incomplete without some comment on the wilderness and wildlife and cultural values which are at stake. Interior has attempted to minimize the potential impact of development on the entire Refuge, focusing most of its attention on the caribou herd. It compares the Central Arctic Herd to the Porcupine herd and bases most of its rosy predictions on this apples and oranges comparison. The Porcupine herd is migratory, while the Central Arctic herd is not. The concentration of caribou on the ANWR calving grounds is 14 times greater than the concentration of the Central Arctic herd. Because the coastal plain is quite narrow in ANWR, the geography limits the availability of suitable calving habitat.

During years when snowmelt is early, calving takes place north of the foothills, out on the coastal plain. The conflicts with oil development in those years would be extreme. Since calf survival rates are higher when calving takes place north of the foothills, the impact of development on the higher population would be higher in those years.

After calving, the cows' energy reserves are at their lowest. At the same time, millions of mosquitoes hatch out and become a severe problem. Their harassment drives small "nursery bands" of cows and calves into huge aggregations in an attempt to escape. In some years, tens of thousands of cows with calves gather near the coast south of Camden Bay--one of the proposed drilling sites. Disturbance from oil exploration and development activities would add stress at a point in the caribou's life when additional stress cannot be tolerated.

And what of the other animals who depend on a wilderness environment? Polar bears and grizzly bears, musk oxen, hundreds of thousands of migratory birds -- all of these rely on the Arctic Refuge. The impact on these species may be even more severe than on the caribou. Predators have been essentially wiped out at Prudhoe Bay--we can probably expect the same result in ANWR if development occurs.

The Administration and the oil industry continually tell the public that they can minimize the impacts and take care of any problems that might occur. "Trust us," they say. Back in July we had a perfect example of the ability of the industry to live up to its promises. An oil spill of 125,000 gallons in Cook Inlet forced a shutdown of the seafood harvest. Even though the industry has been planning for spills for ten years, when one happened they were unable to deal with it and finally the Coast Guard had to take over. I think this incident demonstrates just how poorly man is able to deal with the consequences of his actions when they affect complex natural systems.

The ability of government to write and enforce environmental stipulations is limited at best, but in the hands of an Administration whose fundamental philosophy is opposed to regulation, how much protection is it realistic to expect? As the nursery rhyme put it, "All the King's horses and all the King's men, couldn't put Humpty Dumpty back together again."

Although ANWR is a very different ecosystem from Cook Inlet, it is also fragile and complex. The area is truly an arctic desert. The average annual precipitation at Barter Island is only 6.28 inches, yet oil develpment takes as much as 15 million gallons per exploratory well. Where will the water come from, and what will the impact be? The same question needs to be asked about gravel.

In short, despite all of the information which has been collected about the environment of ANWR, Interior's study has a number of deficiencies which have been pointed out by EPA, the Congressional Research Service and other groups as well as the environmental community.

I submit to you that the Interior Department would have recommended development no matter what, and that the Congress is going to have to ask the real questions in order to make a wise decision. Since the Reagan Administration has no energy policy--other than exploitation for profit--I hope that the Congress will seriously examine the broader issues as well as the true environmental impacts.

Mr. Chairman, in the mid-1970's, following the Arab oil embargo, the oil industry insisted that national security required that a gas pipeline to transport gas from Prudhoe Bay must be built and routed across the coastal plain of the Arctic Range. Back then, the industry claimed all manner of dire consequences if Congress didn't act immediately, and at first Congress panicked and a legislative bandwagon got rolling. Fortunately, cooler heads prevailed, and eventually Congress established a process by which alternative routes were considered. Ultimately a route following the TAPS pipeline then branching over to the Alaska highway was chosen, but the pipeline has never been built. And somehow the world has not come to an end as industry predicted.

We do not dismiss genuine concerns about national security and energy supplies, but these concerns are being used by industry and the Administration to camouflage a greedy and ill-considered proposal with the potential to cause significant environmental degradation and encourage waste of energy supplies. The real questions of energy supply and conservation are being ignored.

I have had the privilege of visiting the Arctic Refuge twice, and was deeply moved by this vast and beautiful wilderness and its wildlife. I have also visited Prudhoe Bay so I know what sort of massive industrial complex is in store for ANWR. We have debated the future of the Refuge for nearly 20 years. Friends of the Earth believes it is time for Congress to recognize the value of this priceless area and give it the wilderness protection it deserves now. We urge you to report S. 1504 and protect this crown jewel for future generations.

Thank you for the opportunity to present our views.

Oil Spill Halts Harvest Of Seafood in Alaska

Tanker Contaminates Cook Inlet

By Hal Bernton
Special to The Washington Post

ANCHORAGE, July 14—An oil spill in Alaska's Cook Inlet has contaminated part of a major salmon catch, forcing an emergency shutdown of the area's $50 million seafood harvest.

The state Department of Fish and Game ordered a temporary halt to fishing early today in a 20-mile stretch of inlet waters after a Kenai Peninsula processing plant discovered at least 1,500 pounds of red salmon tainted by a July 2 tanker spill of an estimated 125,000 gallons of Prudhoe Bay crude.

Cleanup was hampered by faulty predictions about the oil's behavior in the churning waters.

Ken Tarbox, a state fish and game biologist who helps manage the harvest, said the area could reopen later this week if the oil can be kept out of the fishing zones. "We're in the process of assessing the situation," he said. "We're certainly not panicking."

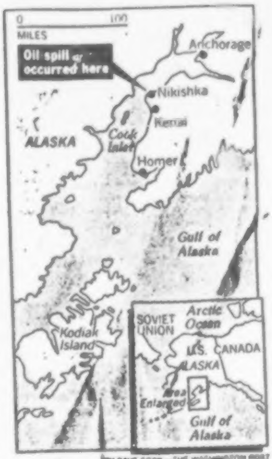
The contaminated fish are a fraction of the 1.6 million red salmon harvested to date from the July salmon run. But keeping the oil off the fish has proved increasingly difficult in recent days. "Oil has been spotted in all the major fishing areas, at different times and in different quantities," Tarbox said.

The spill has dampened the fishermen's prospects for what had been forecast as a bumper harvest. It floats in many of the same tidal rips where salmon, which swim near the surface, also congregate. Once nets get fouled with oil they must be retired until thoroughly scrubbed.

For more than a decade, the oil industry has been planning for a major crude oil spill in Alaska's salmon-rich coastal waters. But when it finally occurred, Cook Inlet response crews were unable to contain the spread of viscous crude. The oil leaked from the tanker Glacier Bay, a Standard Oil Co.-chartered ship, registered in Wilmington, Del., that apparently struck a rock while she was several miles offshore awaiting a berth to unload oil at a Kenai Peninsula refinery.

"There's a lot of anger and frustration and resentment," said Frank Mullen, a Cook Inlet salmon fishermen. "They [fisherman] just can't believe this happened."

Coast Guard officials first estimated the spill at no more than 16,000 gallons, then revised that estimate to 125,000 gallons. By Coast Guard standards, that is a major spill. For the past 12 days, the oil has hung in narrow, tarry slicks, some more than 10 miles long, and occasionally washed up on beaches on both sides of the inlet.



BY DAVE COOK—THE WASHINGTON POST

"Cook Inlet has to be one of the hardest places to clean up an oil spill that I can think of," said Paul O'Brien, the state Department of Environmental Conservation's oil spill program manager. "People . . . think that maybe man has the ultimate hand in these things. But the state of the art . . . when you encounter a Cook Inlet, it is really pushed to the maximum."

Under federal law, the company or companies responsible for a spill must be given first chance at directing that effort. The initial cleanup effort was organized by St. Louis-based Trinidad Shipping, owner of the tanker, and a regional oil industry cooperative formed to deal with spills.

That effort was hampered by faulty predictions about the oil's behavior in the churning Cook Inlet waters. Initially, some experts thought the oil would quickly be dissipated by the inlet's powerful tides and strong currents. Instead, heavy oil pooled in the slicks, which have moved about with the tides and occasionally washed up on the beaches. Ineffective cleanup equipment also has been a major problem.

Last week the Coast Guard, dissatisfied with industry efforts, took control of the cleanup.

The accident has occurred as red, silver and chum salmon migrate up Cook Inlet on their way to spawn in freshwater streams and lakes. About 600 fishermen harvest the fish from drift boats that trail long green-meshed nets from the stern. Another 100 fishermen are based on the beach and use nets strung out close to the shore.

Senator **Bumpers**. Thank you very much, and your whole statement will be inserted in the record.

Ms. **Wilson**. Thank you.

Senator **Bumpers**. Mr. Helfrich? Is that the correct pronunciation?

Mr. **Helfrich**. Yes, it is.

Senator **Bumpers**. Please proceed, Mr. Helfrich.

STATEMENT OF JOHN A. HELFRICH, VICE CHAIRMAN, GREAT LAKES CHAPTER, THE SIERRA CLUB

Mr. **Helfrich**. Good morning. Thank you for giving me this opportunity to speak to you today on behalf of wilderness designation for the coastal plain of the Arctic National Wildlife Refuge.

When I was a boy in grade school, I was a voracious reader of adventure stories, the stories of the Yukon by Jack London, the legends of the French voyagers and fur trappers, Lewis and Clark and others, made my young imagination run wild with visions of heroic encounters with grizzly bears and Indians and panoramic views of wilderness landscapes where no man had ever ventured before.

Those dreams grew up with me as I grew up. Those dreams led me to pursue masters and doctoral degrees in environmental chemistry and engineering and to strive for a better understanding of our environment and how we can live in harmony with it. The knowledge that wilderness still existed somewhere has kept those dreams alive for me in the hope that one day I might be able to have an opportunity to experience it firsthand.

In the summer of 1986, I had that opportunity. My wife Barbara and I had the wonderful opportunity to take an eight day raft trip down the Kongakut River in the Alaska National Wildlife Refuge. The Kongakut River flows north out of the Brooks Range down to the coastal plain to a point called Caribou Pass, the main crossing point for the caribou coming out of the Yukon crossing on to the coastal plain.

Before I left, I knew relatively little about the Arctic National Wildlife Refuge and virtually nothing of the impending storm brewing over the coastal plain. We were simply fulfilling our long-held dreams of experiencing a true wilderness, a place where signs of human intrusion were nonexistent.

Our raft trip down the Kongakut was, to put it mildly, the most fantastic adventure of our lives. We saw hundreds of caribou and Dall sheep, a grizzly bear, wolves, golden eagles and much more. I won't go into the many details of the trip, but I would like to relate one experience that I had that probably best sums up my feelings of the wilderness and its value to me.

One evening after dinner about 10:00 p.m., one of the guides Stan, another camper Jim, and I decided to hike to the top of a low mountain that rose from the river bank on which we were camped. A short hike turned into an arduous two hour climb over the thick arctic tundra. Jim dropped back with a sore leg, but Stan and I finally reached the summit about midnight. A cold wind was blowing out of the north and forced us to slip on our jackets, gloves and hats as we stood there shivering and gazed out across the wind-swept, snowcapped peaks that stretched out in all directions around us. The sun peaked dimly between the clouds to the north, and the only sounds to reach our ears were the soft rush of the wind and the muffled roar of the river far below.

For a moment all of my boyhood dreams came rushing back. There I stood on a mountain peak surveying a land of harsh, rugged beauty which for all intents and purpose was unexplored, unblemished wilderness. I felt as those I had been transported back in time 200 years.

I looked at Stan and myself standing there on that peak, and I felt so small. For me that image put life in perspective. We humans are just a small part of the grand scheme of forces that mold the earth and govern the universe. It was a humbling feeling, one that seems to drain the mean-spiritedness and egotism from a person. I couldn't help wishing everyone on earth could stand there with me and experience that same feeling. I think if they could, there would be more peace on earth, a greater appreciation of human intellect and of our unique position as stewards of the natural world in which we live.

Everyone knows that the supply of oil in the world is finite. Wilderness, for all intents and purposes, is a finite, nonrenewable resource too, just like oil. Wilderness can be destroyed and with it goes the aura that makes the wilderness more than just a bunch of trees and a few animals running about. We need to make very sure of our actions and our motives when we make such irreversible decisions. We had better be pretty desperate when we destroy something which cannot be replaced.

To paraphrase some analogies made by others during the course of the ANWR debate, we would have to be pretty desperate to propose today the damming of the Grand Canyon for hydroelectric power. We would have to be pretty desperate today to propose draining Old Faithful geyser to generate geothermal power. We would have to be pretty desperate today to propose burning a work of art, a priceless masterpiece like the Mona Lisa to stoke our furnaces at home. Yet, here we are today debating the destruction of another priceless masterpiece, one of natural creation, the coastal plain of the Arctic National Wildlife Refuge.

I urge you to consider the magnitude of this decision very carefully. Are we really that desperate? Have we exhausted all of our alternatives? I think not. Please designate the coastal plain as a wilderness.

Thank you.

[The prepared statement of Mr. Helfrich follows:]

Wilderness Designation for the Coastal Plain, ANWR
Testimony for Senate Public Lands Subcommittee

Thurday, October 22, 1987

John A. Helfrich, 2125 Ivy Court, Champaign, IL 61821

Good morning. My name is John Helfrich. Thank you for giving me this time to speak to you on behalf of wilderness designation for the coastal plain of the Arctic National Wildlife Refuge.

When I was a boy in grade school I was a voracious reader of adventure stories. Among my favorites were stories about the exploits of the men who first explored the wilderness of the North American continent. The legends of the French voyageurs and fur trappers, Lewis and Clark, Father Pierre Marquette, Daniel Boone, and the stories of the Yukon by Jack London made my young imagination run wild with visions of heroic feats, daring encounters with grizzly bears and Indians, and of panoramic views of a wilderness landscape where no white man had ever ventured before.

Those dreams grew with me as I grew up. I lived in a semi-rural area where I had the freedom to roam through woods and fields, to explore the river that lay at my back door, to let my youthful dreams of adventure and conquest mature into a deep appreciation for nature and the intricate web of life that I saw all around me. Those dreams have led me to pursue master's and doctoral degrees in environmental chemistry and engineering and to strive for a better understanding of our environment and how mankind can live in harmony with it. But the application of rigorous scientific theory has not, and can never, extinguish the aura of wilderness adventure that I still carry with me from my boyhood days. The knowledge that wilderness still exists somewhere has kept those dreams alive for me in the hope that oneday I might have an opportunity to experience it firsthand.

I have had opportunities to hike and canoe in a few semi-wilderness areas over the years but a trip to a true wilderness, the wilderness of my boyhood dreams, remained just a dream. Well my dreams came true in the summer of 1986. That year, my wife Barbara and I decided that we couldn't deny ourselves the opportunity any longer. We signed up for an 8-day raft trip on a river with a strange sounding name, the Kongakut, way up in the far northeastern corner of Alaska, in a place called the Arctic National Wildlife Refuge. I knew relatively little about the refuge at that time, and virtually nothing of the impending storm brewing over the coastal plain. We were simply fulfilling longheld dreams of experiencing a true wilderness, a place where signs of human intrusion were nonexistent.

Our raft trip down the Kongakut River was, to put it mildly, the most fantastic adventure of our lives. We saw hundreds of caribou and Dall sheep, a grizzly bear, wolves, golden eagles and much more. I won't go into the many details of the trip, but I would like to relate one experience that I had that probably best sums up my feelings of wilderness and its value to me. Being in the land of the midnight sun one is not restricted to huddling around the campfire after dinner. So, Stan who was one of the guides, Jim, a fellow camper, and myself decided at about 10pm to hike to the top of a low mountain that rose gently from the river bank on which we were camped. Thick grey clouds scudded across the sky and partially hid the sun that skirted low on the northern horizon. But there was still plenty of light and the clouds didn't look too threatening so off we went.

The short hike turned into an arduous two-hour climb over the thick arctic tundra. Jim dropped back with a sore leg but Stan and I finally reached the summit at midnight. A cold wind blowing out of the north forced us to slip on our jackets, gloves and hats as we stood there shivering and gazed out across the wind-swept, snow-capped peaks that stretched out in all directions around us. The sun peeked dimly between the clouds to the north and the only sounds to reach our ears were the soft rush of the wind and the muffled roar of the river far below. For a moment all my boyhood dreams came rushing back. There I stood on a mountain peak, surveying a land of harsh, rugged beauty which, for all intents and purposes, was unexplored, unblemished wilderness. I felt as though I had been transported back in time 200 years. I looked at Stan and myself standing there on that peak and I felt so small. For me that image put life in perspective: we humans are just a small part in the grand scheme of forces that mold the Earth and govern the Universe. It was a humbling feeling, one that seems to drain the mean-spiritedness and egotism from a person. I couldn't help wishing everyone on Earth could stand there with me and experience that same feeling. I think if they could there would be more peace on Earth, a greater appreciation of human intellect and of our unique position as stewards of the natural world that we live in.

I think it is the pinicle of human arrogance and egotism that leads this Administration to propose oil and gas development for the coastal plain of ANWR. Everyone knows that the world's supply of oil is finite. But are we preparing ourselves for the future? Not very effectively in my opinion. We are like a drug addict --we're hooked on oil and we can't seem to get enough. ANWR is peddled like one last big fix -- "please give us this one and we'll stop, honestly," they implore us. This from an Administration that has consistently downplayed or ignored opportunities to wean ourselves from our deadly habit. They don't want to have to make the tough decisions that will put America on a stable energy path for the future.

Wilderness, for all intents and purposes, is a finite, non-renewable resource too, just like oil. Wilderness can be destroyed, and with it goes the aura that makes a wilderness more than just a bunch of trees and few animals running about. We need to be very sure of our actions and our motives when we make such irreversible decisions. We had better be pretty desperate when we destroy something which cannot be replaced. To paraphrase some analogies made by others during the course of the ANWR debate:

* we would have to be pretty desperate to propose today the damning the Grand Canyon for hydroelectric power,

* we would have to be pretty desperate to propose today to drain Old Faithful geyser to generate geothermal power,

* we would have to be pretty desperate to propose burning a work of art, a priceless masterpiece, like the Mona Lisa, to stoke our furnace,

yet here today we are debating the destruction of another priceless masterpiece, one of natural creation, the coastal plain of the Arctic National Wildlife Refuge. I urge you to consider the magnitude of this decision very carefully. Are we really that desperate? Have we exhausted all of our alternatives? I think not. Please designate the coastal plain as wilderness. Thank you.

Senator **Bumpers**. Thank you very much, Mr. Helfrich.

Mr. McCarthy.

STATEMENT OF STEPHEN R. McCARTHY, PORTLAND, OR

Mr. **McCarthy**. In 1959 when I was 17 years old, I picked the loneliest, most remote spot I could find and could reasonably expect to get to and decided to hike across it with two friends. We had no guides. No one as far as we knew had ever done this trip before. Our route was from Barter Island, across the coastal plain tundra, up the Hula Hula River to Lake Schrader, through the Romanzoff Mountains, and down the east fork of the Chandalar to Arctic Village. There is a map attached of the route we took.

Two eskimos took us from Kaktovik to the shore in a small boat. We stepped off onto the two foot high tundra edge at the Arctic Ocean and stood completely alone. From the edge of the Arctic Ocean to the hamlet of Arctic Village, 210 miles to the south, there was not a human being. The flat coastal plain alone took us several days to cross. We saw no buildings, no trails, no litter, no debris, no pipelines, no roads, no smoke or smokestacks. We heard no vehicles, no airplanes, no power saws, no three wheelers, no gunshots, no radios, nor boats.

We saw a delicate carpet of flowers, a sparse collection of birds of all kinds because nothing at least in our experience was really abundant. And we heard only the wind. We saw a few caribou, a fox, caught some grayling, got rained on good, snowed on a little, and we began to feel an incredible loneliness, a searing, empty, almost desperate sense of isolation. Without knowing it, we had stumbled into a world when humans were only a minor feature of the earth.

Lately it seems to me as a race we have not done well by the earth. We have been devouring the earth's surface, destroying vegetation, creatures, land forms, cultures and perhaps the fundamental systems that keep us here at all.

In 1959 we stumbled into a place where none of these disasters had taken place. Since that time a few hundred or a few thousand people have, no doubt, had similar experiences. And thanks to great good fortune and minor political miracles, they still can, at least until now.

Your committee will decide whether another few hundred or few thousand people can have this or a similar experience this year, next year and the year after and perhaps forever, or you can decide for sure that no one can.

In all the world there are only a handful of places left where this type of experience is possible. I have seen in the Himalayas, in Europe, in Alaska, Canada and the U.S.A. these special places disappear. There are still a few left, and most of those few unfortunately cannot be saved. The destruction has already begun. In many cases the government of the country involved is too poor, too wrongheaded, or simply doesn't have enough muscle to deal with the powerful interests and to set aside such a global jewel, such a place of unique and overpowering but fragile beauty and loneliness.

Our country can save this place.

[The prepared statement of Mr. McCarthy follows:]

Testimony in Opposition to Senate Bill No.1217
On the Subject of the
Arctic National Wildlife Refuge (ANWR)
Before the Senate Energy Committee

October 22, 1987

Stephen R. McCarthy
1646 N.W. 32nd Street
Portland, Oregon 97210
(503)248-9470, (503)227-7976

In 1959, when I was 17 years old , I picked the loneliest, most remote spot I could find -- and could reasonably expect to get to -- and decided to hike across it with two friends. Our route was from Barter Island (Kaktovik) across the coastal plain tundra, up the Hula Hula River, to Lake Schrader, through the Romanzoff Mountains of the Brooks Range and down the East Fork of the Chandalar River to Arctic Village.

In 1959 we encountered true wilderness.

Two Eskimos took us from Kaktovik to the edge of the tundra in a small boat. We stepped off, on to the two foot high landform, and stood, completely alone. From the edge of the Arctic Ocean to the hamlet of Arctic Village, 210 miles to the south there was not a human being. The flat

coastal plain alone took us several days to cross. We saw no buildings, no trails, no litter, no debris, no pipelines, no roads, no smoke or smokestacks. We heard no vehicles, no airplanes, no power saws, no three wheelers, gunshots, radios, nor boats.

We saw a delicate carpet of flowers, a sparse collection of birds of all kinds -- nothing was abundant-- and we heard only the wind. In July there was frost every night, and new snow made the Northface of the Brooks Range glisten. Eerie long, low banks of clouds moved in across the front of the Brooks, in the twilight providing a pink "sunset" and in the midday often obscuring the surroundings, forcing us to travel by compass.

During our days on the coastal plain we saw a few caribou, a fox, caught some greyling, got rained on good and snowed on a little. And we began to feel an incredible loneliness, a searing, empty, almost desperate sense of isolation. Without knowing it, we had nibbled at the edge of the world of long ago when humans were only a minor feature of the earth.

In the last few hundred years, but especially since the end of World War II we humans have not done well by the earth. We have more or less systematically devoured most of the earth's surface, destroying vegetation, creatures, landforms, other human cultures, and most recently we have learned, perhaps the fundamental systems that keep us here at all.

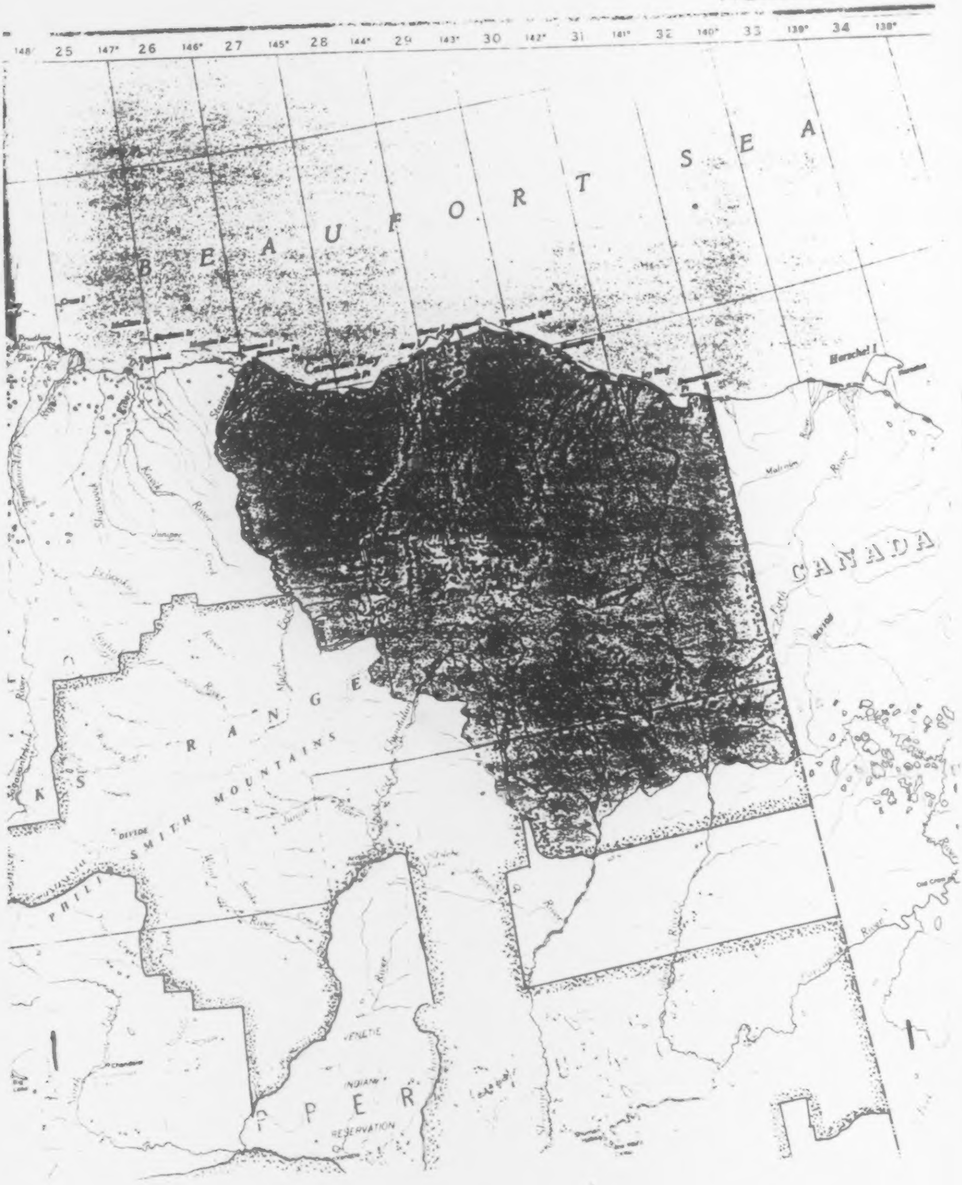
In 1959 we stumbled into a place where none of this had happened. Since that time a few thousand people have, no doubt, had similar experiences in what is now known as ANWR. And thanks to great fortune and minor political miracles, they still can, at least until now.

Your committee will decide whether another few hundred or few thousand people can have this or a similar experience this year, and next year, and the year after and perhaps forever. Or you can decide for sure that no one can.

In all the world there are only a handful of places left where this type of experience is possible. I have seen in the Himalayas, in Europe, in Alaska, Canada and the USA, these special places disappear. There are still a few left. Most of those that remain cannot be saved. The destruction has already begun , albeit perhaps piecemeal. In many cases the government of the country involved is too poor, or too wrongheaded, or too much in thrall to cattle, oil, timber or mineral lords to set aside such a global jewel, a place of unique and overpowering -- but fragile-- beauty and loneliness.

Our country can save this place. You can save this place.

NORTHERN ALASK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Malcolm
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River
Chandalar
Chandalar
VENETIE
INDIAN
RESERVATION
P P E R
Old Crow
River

Senator BUMPERS. Thank you very much, Mr. McCarthy.

I just want you to know that when I was at Schrader Lake, we fished almost until midnight. And it was the most beautiful day I have ever seen. The sun was shining brightly. It was nice and warm. We could roll up our sleeves. When Wyche Fowler came back from Alaska, he said do you remember that afternoon we were at Schrader Lake. And I said yes. And he said, well, I want you to know the weather is just like that one day a year. [Laughter.]

That was a magnificent experience—that whole thing.

I thank all of you for your testimony and your graphic descriptions of your experiences there.

Mr. Charles D. Matthews, National Ocean Industries Association, Washington; Morris Amitay, Americans for a Rational Energy Policy; Susan Moya, Manager of the Energy and Natural Resources Policy, United States Chamber of Commerce; Isabelle Tapia, Executive Coordinator, Coalition for American Energy Security; and Mr. Carlton C. Robinson, Executive Vice President, Highway Users Federation, Washington, D.C.

Is it Tapia?

Ms. TAPIA. Yes, sir, it is. It is Tapia.

Senator BUMPERS. Ms. Tapia, please proceed.

STATEMENT OF ISABELLE TAPIA, EXECUTIVE COORDINATOR, COALITION FOR AMERICAN ENERGY SECURITY

Ms. TAPIA. Thank you very much, Mr. Chairman. I would like to note that this is the first opportunity for the committee to hear from the diverse groups who have an interest in ANWR development. In the interest of time, Mr. Chairman and members of the panel, I will keep my remarks very brief.

My name is Isabelle Tapia. I am the Executive Coordinator of the Coalition for American Energy Security. The coalition was formed for the purpose of informing the American public on the significance of the future status of the coastal plain of the Arctic National Wildlife Refuge to America's national security and energy independence.

The coalition currently consists of 44 broad-based and representative organizations, companies, trade associations, labor unions, and other groups who are deeply concerned about America's declining domestic oil production and our Nation's growing dependence on insecure sources of foreign crude oil. A list of the coalition's current membership is appended to my testimony and has been submitted to the record in this proceeding.

Mr. Chairman, I will submit the balance of my testimony for the record. This will serve to expedite the important work of the committee on pending legislation to open the coastal plain.

I would, however, like the record to show that all of the 44 members of the coalition were and are prepared to have witnesses appear before this committee. We recognize, however, that this proceeding does not constitute a public opinion survey nor a vote by witness count. We have, therefore, chosen to submit the balance of our testimony for the record. This will enable the committee to have more time to carefully consider the profoundly important policy issues presented by the coastal plain study area.

Mr. Chairman, I am submitting along with my testimony the testimony of a number of other members of the coalition. Additional testimony of members of the coalition will be submitted before the committee record is closed. Mr. Chairman, on behalf of the membership of the Coalition for American Energy Security, I would like to add that we have followed this committee's deliberations on this important issue and wish to compliment the committee on the seriousness with which it has approached this important policy decision. Thank you, Mr. Chairman.

[The prepared statement of Ms. Tapia follows. Additional submissions appear in Appendix II.]

TESTIMONY
OF
ISABELLE TAPIA
EXECUTIVE COORDINATOR
FOR THE
COALITION FOR AMERICAN ENERGY SECURITY
BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
ON THE COASTAL PLAIN OF THE
ARCTIC NATIONAL WILDLIFE REFUGE

October 22, 1987

My name is Isabelle Tapia. I am the Executive Coordinator of the Coalition for American Energy Security. The Coalition was formed for the purpose of informing the American public on the significance of the future status of the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) to America's national security and energy independence.

The Coalition currently consists of 44 broad-based and representative organizations, companies, trade associations, labor unions and other groups who are deeply concerned about America's declining domestic oil production and our nation's growing dependence on insecure sources of foreign crude oil. A list of the Coalition's current membership is appended to my testimony and has been submitted for the record in this proceeding.

Mr. Chairman, I will submit the balance of my testimony for the record. This will serve to expedite the important work of the Committee on pending legislation to open the Coastal Plain.

I would, however, like the record to show that all of the 44 members of the Coalition were, and are, prepared to have witnesses appear before the Committee. We recognize, however, that this proceeding does not constitute a "public opinion survey" or a "vote by witness count." We have, therefore, chosen to submit the balance of our testimony for the record. This will enable the Committee to have more time to carefully consider the profoundly important policy issues presented by the Coastal Plain study area.

The subject of these hearings scheduled by the Senate Energy and Natural Resources Committee are of national and international significance. This significance must be measured in terms broader than domestic energy policy and fish and wildlife administration. It must be understood and recognized that, ultimately, the subjects addressed in these hearings have important ramifications for foreign policy, national security, the American economy and international trade.

The nations of the Middle East are major players in international affairs today because of their levels of crude oil production, their huge reserves and their ability to control prices. If the Coastal Plain of ANWR is opened to development under reasonable and prudent environmental regulations, the United States will benefit from greater domestic production.

Oil imports in the United States were up 24% in 1986 compared to 1985 and, on an annual basis, are now 35% of total

U.S. consumption. Such heavy reliance on oil imports weakens the U.S. economy, exports American jobs, and seriously undermines our national security.

Today, Prudhoe Bay and Alaska's North Slope provide more than 20 percent of the nation's total domestic crude oil production. These resources will begin to significantly decline. In the future, the 1.5 million acre Coastal plain has the potential, if it is opened, for enabling Alaska's North Slope to continue to provide a major alternative to imported oil and a very substantial contribution to our nation's petroleum needs.

I appear here today on behalf of our 44 members who support opening the Coastal Plain and S. 1217, the only bill before the Senate. Our members believe that the Coastal Plain is an issue of vital concern to the United States and we urge the Committee to proceed promptly to report a bill to the Senate.

Thank you Mr. Chairman.

COALITION FOR AMERICAN ENERGY SECURITY
1050 Thomas Jefferson Street, N.W. - Sixth Floor
Washington, D.C. 20007

M. Isabelle Tapia
Executive Coordinator

(202) 333-7484

MEMBERSHIP

ALASKA OIL AND GAS ASSOCIATION
AMERICAN ASSOCIATION OF PETROLEUM LANDMEN
AMERICAN INSTITUTE OF MERCHANT SHIPPING
AMERICAN PETROLEUM INSTITUTE
AMERICAN TRUCKING ASSOCIATIONS
AMERICANS FOR A RATIONAL ENERGY POLICY
ARCTIC SLOPE REGIONAL CORPORATION
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
ASSOCIATION OF OIL PIPELINES
BP NORTH AMERICA
BROWN & ROOT, INC.
CATERPILLAR INC.
CHEVRON U.S.A, INC.
CROWLEY MARITIME
DRESSER INDUSTRIES, INC.
FLUOR CORP.
HEHR INTERNATIONAL INC.
HIGHWAY USERS FEDERATION
INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS
INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS
JOINT MARITIME CONGRESS
MARRIOTT CORPORATION
NAACP-ANCHORAGE BRANCH
NATIONAL ASSOCIATION OF HOME BUILDERS
NATIONAL ASSOCIATION OF MANUFACTURERS
NATIONAL ASSOCIATION OF REALTORS
NATIONAL CATTLEMEN'S ASSOCIATION
NATIONAL COAL ASSOCIATION
NATIONAL MARINE ENGINEERS BENEFICIAL ASSOCIATION
NATIONAL MARINE MANUFACTURERS ASSOCIATION
NATURAL GAS SUPPLY ASSOCIATION
NATIONAL OCEAN INDUSTRIES ASSOCIATION
NATIONAL TOUR ASSOCIATION, INC.
NATIONAL WOOL GROWER'S ASSOCIATION
NL INDUSRIES, INC.
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
PUBLIC LANDS COUNCIL
RECREATION VEHICLE INDUSTRY ASSOCIATION
ROCKY MOUNTAIN OIL AND GAS ASSOCIATION
THE STANDARD OIL COMPANY
THE NATIONAL GRANGE
U.S. CHAMBER OF COMMERCE
WESTERN OIL AND GAS ASSOCIATION

Senator **Bumpers**. Thank you very much, Ms. Tapia.

Our next witness is Mr. Amitay. Is that correct?

Mr. **Amitay**. That's correct, Senator.

Senator **Bumpers**. Oh, I remember you, Morris. I'm sorry. Please proceed.

STATEMENT OF MORRIS J. AMITAY, AMERICANS FOR A RATIONAL ENERGY POLICY

Mr. **Amitay**. Mr. Chairman, I am attorney here in Washington and a former director of the American Israel Public Affairs Committee.

Today I am testifying on behalf of an ad hoc group of Jewish community leaders from around the country. We call ourselves Americans for a Rational Energy Policy. Because we seek to educate the American Jewish community about the link between greater U.S. energy independence and freedom from oil blackmail, we have joined the Coalition for American Energy Security.

In the past we have taken stands in favor of the expeditious filling of our Nation's strategic petroleum reserve and the deregulation of natural gas. Today the major issue we are concerned about is the future development of the Arctic coastal plain.

The decisions that this committee and the Congress must take with regard to the future development of oil reserves in the Arctic National Wildlife Refuge will undoubtedly have important ramifications for U.S. foreign policy in the Middle East and also for Israel's future security. Those who recognize the danger of growing U.S. dependence on foreign source oil, and particularly Middle East oil, should not hesitate in supporting legislation such as Senator Murkowski's bill permitting oil exploration with due regard for environmental safeguards.

We are faced with the fact that the current flow of close to 2 millions barrels of oil per day from the adjacent Prudhoe Bay fields is declining steadily and is due to run out by the end of the century. Potential production from new finds in ANWR would be the only domestic substitute.

Already the trend of increasing imports is alarming with almost one half of U.S. oil now being imported. And while we can all support increased conservation measures and more attention to the development of alternative energy sources, the most urgent energy issue to come before the Congress in the near future will be whether drilling for oil in ANWR will be permitted.

The large flotilla of American and other free world warships now deployed in the Persian Gulf is a telling sign of how energy dependence dictates foreign policies today. And the gasoline lines of 1974 demonstrated how the oil weapon could be used as an instrument of coercion and blackmail. I won't get into a graphic description of how I waited two hours in a gasoline line to get my three gallons of gas at that time.

The latest joint program plan of the National Jewish Community Relations Council which is put out as guidance to 113 community Jewish agencies contains a very important warning. It cites the inexorable increase in the amount of oil being important in the United States and also stated that "the ability of our government to formulate and conduct foreign policy undominated by energy considerations, and without fear of economic reprisal, must be a clear, conscious and fundamental objective." We could not agree more.

What remains is the difficult task of getting more people in this country and more members of Congress to acknowledge the link between our national security and greater energy independence and to act accordingly. If the Congress acts responsibly on ANWR, we will all be able to breathe much easier in the face of any attempts by foreign nations to play petro-politics with our oil supplies a decade from now.

Thank you.

[The prepared statement of Mr. Amitay follows:]

TESTIMONY OF MORRIS J. AMITAY

SENATE ENERGY & NATURAL RESOURCES COMMITTEE

October 22, 1987

Mr. Chairman:

My name is Morris J. Amitay. I am an attorney here in Washington, and a former director of the American Israel Public Affairs Committee from 1974 until 1980.

I am testifying today on behalf of an ad hoc group of Jewish community leaders from around the country calling ourselves Americans for a Rational Energy Policy. I would like to ask permission to have inserted in the hearing record at the end of my testimony the information contained in our groups' current brochure outlining our goals. Because we seek to educate the American Jewish community about the link between greater U.S. energy independence and freedom from oil blackmail, we have joined the Coalition for American Energy Security.

In the past we have taken stands in favor of expeditious filling of our nation's Strategic Petroleum Reserve and the deregulation of natural gas. Today the major issue we are concerned about is the future development of the energy resources of the Arctic Coastal Plain.

The decisions that this Committee and the Congress must take with regard to the future development of oil reserves in the Arctic National Wildlife Refuge will undoubtedly have important ramifications for U.S. foreign policy in the Middle East and also Israel's future security. Americans who recognize the danger of growing U.S. dependence on foreign source oil, and particularly Middle East oil, should not hesitate in supporting legislation permitting oil exploration with due regard for environmental safeguards. We are faced with the fact that the current flow of close to 2 million barrels of oil per day from the adjacent Prudhoe Bay fields is declining steadily and is due to run out by the end of this century. Potential production from new finds in ANWR would be the only domestic substitute.

Already, the trend of increasing imports is alarming, with almost half of U.S. oil now being imported. And while we support increased conservation measures and more attention to the development of alternative energy sources, the most urgent energy issue to come before the Congress in the near future will be whether drilling for oil in ANWR will be permitted.

The large flotilla of American and other Free World warships now deployed in the Persian Gulf, is a telling sign of how energy dependence dictates foreign policies today. And the gasoline lines of 1974 demonstrated how the oil weapon could be used as an instrument of coercion and blackmail.

The latest Joint Program Plan of the National Jewish Community Relations Council put out as guidance to eleven national and 113 community Jewish agencies contains a very important warning. After citing the "inexorable increase in the amount of oil being imported to the U.S..", this document also states that "the ability of our government to formulate and conduct foreign policy undominated by energy considerations, and without fear of economic reprisal, must be a clear, conscious and fundamental objective." We could not agree more.

What remains is the difficult task of getting more people in this country and more members of Congress to acknowledge the inextricable link between our national security and greater energy independence - and act accordingly.

If the Congress acts responsibly on ANWR, we will all be able to breathe much easier in the face of any attempts by foreign nations to play petro-politics with our oil supplies a decade from now.

The goal is also achievable—if we have the will to move forward.

The Solutions

The blueprint for solving our still-heavy dependence on foreign oil supplies consists of the following six steps:

1. *Exploration of the vast, as-yet-undiscovered oil and gas resources, onshore and offshore, must be encouraged.* There are no practical alternatives now to oil and gas—which, together, supply about 70 percent of our energy needs.
2. *Price controls on production of all domestic natural gas must be removed.* Gas is the only primary fuel still under complicated government price regulations, which have discouraged gas development.
3. *Moratoria and other arbitrary restrictions and delays on petroleum drilling in U.S. waters must be eliminated.* Unlike the U.S., other countries—most notably Canada and Great Britain—are, or are becoming, energy self-sufficient through development of their offshore oil resources. Experience has shown that we can protect our environment at the same time.
4. *Increased development of the nation's coal resources and nuclear power must be encouraged.* These resources have the potential to generate much more of the nation's electricity.
5. *The nation's Strategic Petroleum Reserve must be filled as rapidly as possible.* The Reserve can serve as a buffer against unforeseen foreign oil cutoffs.
6. *Energy efficiency and conservation efforts by all Americans must be actively continued and stimulated.* The wise and efficient use of energy by households, industries, and transportation systems can help reduce our dependence on foreign oil.

These are attainable goals. They provide a blueprint for our nation—to construct a positive program of greater energy security, free from the oil weapon of the Arab producers.

Americans for a Rational Energy Policy is an *ad hoc* group of Jewish Community leaders from around the country. They seek to educate American Jews about the links between greater U.S. energy independence, and freedom from Arab oil blackmail.

AMERICANS FOR A RATIONAL ENERGY POLICY
444 N. Capitol St., NW · Suite 712
Washington, D.C. 20001
(202) 347-9014

A Challenge to America and The American Jewish Community

Can we replace . . .

U.S. Dependence on Arab Oil by Increased American Energy Development?

We can

We must

Americans for a
Rational Energy Policy

The Problem

Despite what you hear about a "glut," our country is still heavily dependent on foreign sources of oil. Too much so. A lot of the oil that we—and our friends and allies—use comes from the Arab members of OPEC.

We must *not* . . . and we need *not* . . . remain dependent on Arab oil.

We can become more energy self-sufficient. We have the *resources* to do so. We need to know what to do—and what policies to support.

Background

The year 1948 was a fateful year in more ways than one. That year—the rebirth of Israel as a nation—also marked a subtle, yet significant, energy shift for the United States. For the first time, America became a *net* importer of oil. We moved from reliance on domestic oil to dependence on cheaper foreign imports.

Twenty years later, in 1968, we reached a milestone on the causeway to catastrophe. That year, we imported *more than 1 billion barrels of oil—over 20 percent of all the oil we used.*

Little was said at the time, and nothing was done, to dispel the dash toward energy disaster.

Disaster struck five years later, in late 1973. The oil-rich Arab nations embargoed oil shipments to the United States and to several other countries friendly to Israel in the wake of the Yom Kippur war.

In that year, America imported *more than 2 billion barrels of oil—36 percent of all the oil we used.*

For the first time, with the embargo, Americans suffered a serious shortage of oil. The shortage, combined with government controls, led to long lines at gasoline stations . . . factory layoffs . . . closed schools and businesses.

At the same time, world oil prices skyrocketed. From about $3.00 a barrel on October 1, 1973—two weeks before the embargo—prices rose to more than $5.00 a barrel on October 16, 1973, a 60 percent jump. On January 1, 1974—at the height of the embargo—prices had risen to around $12.00 a barrel, a 300 percent increase in just three months.

The embargo also threatened an independent U.S. foreign policy in the Middle East.

Disaster struck again five years after the end of the Arab oil embargo, following the Shiite revolution in Iran.

That year, 1979, America imported *more than 3 billion barrels of oil—over 45 percent of all the oil we used.*

Shortages again appeared. And world oil prices shot up once more — until they reached $34.00 a barrel in 1981 — *10 times higher than they were just eight years earlier.*

The Present Situation

Clearly, oil has become a political and military weapon in the hands of the Arab oil producers. Fortunately, for *now*, the weapon has been blunted. Supplies are adequate, and world oil prices have fallen [redacted] — to around $[illegible].00 a barrel.

But the Arab oil weapon remains poised. It could be used again in the future — as it has in the past — to blackmail Europe and America into distancing themselves from Israel.

While supplies are adequate today, there is in truth no "oil glut" in the United States as long as we import about one-third of the oil we need.

Ominously, imports of oil to the United States are on the rise again. We now import about the same percentage of oil as we did just before the Arab oil embargo of 1973.

The danger signs are clear for all to see: the war between Iran and Iraq . . . the attacks on tankers that carry some 8 million barrels a day through the Strait of Hormuz . . . the basic instability in other Middle East countries . . . the endemic terrorist threat.

The challenge to our diplomatic flexibility and economic security will continue . . . as long as we depend on oil from the Arab nations that surround Israel . . . and until we take practical steps to achieve greater energy self-sufficiency.

The means to reach that goal are realistic and achievable.

The goal is realistic because we have—right here in our country waiting to be found and developed—vast quantities of energy.

America's Vast Energy Resources

Government and industry studies suggest that the United States has the following amounts of the major energy sources—still to be produced:

Crude oil/gas liquids . . . 164 billion barrels
  (more than this country has ever produced)

Natural gas . . . 970 trillion cubic feet
  (well over 50 percent more gas than this country has ever produced)

Coal recoverable reserves . . . 237 billion tons
  (the equivalent of about 911 billion barrels of oil)

Uranium recoverable reserves . . . 889,000 tons
  (enough to sustain the nuclear power industry well into the 21st Century)

Senator **Bumpers**. Morris, I think this is one of the few times we ever had a disagreement. We do have a small disagreement on this, and we will talk about it later.

Ms. Moya.

STATEMENT OF SUSAN C. MOYA, MANAGER OF THE ENERGY AND NATURAL RESOURCES POLICY, U.S. CHAMBER OF COMMERCE

Ms. **Moya**. Thank you, Mr. Chairman. My name is Susan Moya, and I am Manager of Energy and National Resources Policy at the U.S. Chamber of Commerce. I am appearing today on behalf of our more than 180,000 members. Our membership is comprised of state and local chambers of commerce associations and 1500 in small businesses. I would like to point out that 90 percent of our membership is comprised of small businesses.

We appreciate this opportunity to express our support for S. 1217. Continued orderly oil and gas development with appropriate environmental safeguards is vitally important to our members. Dependable supplies of energy are essential for farms, factories, businesses, and transportation. Our members well remember the gas shortages and curtailments of the 1970s which resulted in schools and factories being closed and people being laid off.

They are concerned about the projections of oil imports exceeding 50 percent in the next year or two especially since oil consumption in the U.S. has exceeded production for more than 20 years.

Growing oil imports subject the U.S. to extreme price fluctuations and supply disruptions. The current situation in the Persian Gulf, as witnesses have indicated, clearly underscore the need for the U.S. to develop its domestic resources, oil, coal, nuclear and others.

The coastal plain of ANWR represents the Nation's most promising on-shore frontier for major oil and gas prospects. We believe that by leasing the coastal plain now, oil could come on line just as the production from Prudhoe Bay is at a serious decline.

The Chamber recognizes that the coastal plain is prized not only for its oil and gas potential, but also for its valuable wilderness. And while we support oil and gas exploration and development on the coastal plain, we condition this support by saying that extreme care must be taken to protect the valuable natural resources of the coastal plain. And we believe that 1217 accomplishes this important goal.

Experience on the north slope has shown that oil and gas development can be compatible with the Alaskan environment and wildlife. We don't believe that the coastal plain should be an "either/or" question. And I believe this point was clearly demonstrated to me during my visit to Prudhoe Bay and ANWR this summer. The Chamber's president, Dr. Lesher went on a trip and came to the same conclusion independent of mine. We believe that the technology and experience of the north slope activities will be used and improved in the coastal plain. The Chamber believes that the U.S. can meet its energy needs and provide a wilderness legacy for the future.

Authorizing the leasing of the coastal plain for oil and gas exploration and development could become America's insurance policy for tomorrow.

Mr. Chairman, thank you for the opportunity to be here and submit the Chamber's views.

[The prepared statement of Ms. Moya follows:]

Statement of the U.S. Chamber of Commerce

ON: S. 1217, "The Arctic Coastal Plain Public Lands Leasing Act"

TO: Senate Committee on Energy and Natural Resources

BY: Susan C. Moya

DATE: October 22, 1987

The Chamber's mission is to advance human progress through an economic,
political and social system based on individual freedom,
incentive, initiative, opportunity and responsibility.

The U.S. Chamber of Commerce is the world's largest federation of business companies and associations and is the principal spokesman for the American business community. It represents approximately 180,000 businesses and organizations, such as local/state chambers of commerce and trade/professional associations.

More than 91 percent of the Chamber's members are small business firms with fewer than 100 employees, 58 percent with fewer than 10 employees. Yet, virtually all of the nation's largest companies are also active members. We are particularly cognizant of the problems of smaller businesses, as well as issues facing the business community at large.

Besides representing a cross section of the American business community in terms of number of employees, the Chamber represents a wide management spectrum by type of business and location. Each major classification of American business—manufacturing, retailing, services, construction, wholesaling, and finance—numbers more than 11,000 members. Yet no one group constitutes as much as 29 percent of the total membership. Further, the Chamber has substantial membership in all 50 states.

The Chamber's international reach is substantial as well. It believes that global interdependence provides an opportunity, not a threat. In addition to the 56 American Chambers of Commerce Abroad, an increasing number of members are engaged in the export and import of both goods and services and have ongoing investment activities. The Chamber favors strengthened international competitiveness and opposes artificial U.S. and foreign barriers to international business.

Positions on national issues are developed by a cross section of its members serving on committees, subcommittees and task forces. Currently, some 1,800 business people participate in this process.

STATEMENT
on
S. 1217, "THE ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT"
before the
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
for the
U.S. CHAMBER OF COMMERCE
by
Susan C. Moya
October 22, 1987

I am Susan Moya, Manager, Energy and Natural Resources Policy, Resources Policy Department of the U.S. Chamber of Commerce. I am appearing today on behalf of the more than 180,000 members of the Chamber.

The Chamber appreciates this opportunity to express its support for S. 1217, introduced by Senators Murkowski and Stevens, which amends the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the public lands within the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) in northeastern Alaska for oil and gas exploration, development, and production.

The Chamber supports Congressional authorization of an orderly oil and gas leasing program for the entire 1.5 million-acre Coastal Plain at a pace and under such circumstances that will avoid unnecessary adverse effects on the environment. Continued orderly oil and gas development, with appropriate environmental safeguards, is vitally important to the Chamber's large and small business members. Dependable future domestic supplies of energy are needed for homes, farms, factories, businesses, and transportation and for strengthening the national economy, increasing federal revenues, providing jobs, and lowering the U.S. balance of trade deficit.

The Chamber is concerned greatly about the adequacy and security of America's energy supplies. It is troubled by the fact that oil consumption in the U.S. has exceeded domestic production for more than 20 years and by projections indicating that the U.S. could be importing almost one-half of its oil by as early as 1990 under certain, not unrealistic, conditions.

Growing imports have placed the U.S. in a precarious energy security position—subject to extreme price fluctuations and supply disruptions. Unless steps are taken to increase development of domestic petroleum resources, the U.S. will become continually more reliant upon foreign suppliers. As long as the U.S. continues to import oil, it continues to export dollars and jobs and becomes increasingly more vulnerable to those Mideast countries that have the leverage in determining the world price of oil.

It is generally agreed that the 1.5 million-acre Coastal Plain contains the nation's most promising onshore frontier for major oil and gas prospects. Although expert opinion is divided over the size of the Coastal Plain's petroleum resources, estimates of the size of the reserves cannot be confirmed without Congressional approval of exploration.

The Chamber recognizes that the Coastal Plain is prized not only for its oil and gas potential but also for its valuable wildlife. While the Chamber supports oil and gas exploration and development on the Coastal Plain, it cautions that extreme care must be taken to protect the valuable natural resources of this national treasure. The Chamber believes that S. 1217 accomplishes this important goal. S. 1217 directs the Secretary of the Interior to promulgate whatever stipulations, rules, and regulations that are necessary and appropriate to ensure that all activities associated with oil and gas development be conducted in a manner that protects the fish and wildlife resources and the environment of ANWR.

Experience shows that oil and gas development can be compatible with the Alaskan environment and wildlife. The results of 18 years of operations at Prudhoe Bay provide compelling evidence that carefully planned and executed oil and gas exploration, development, production, and transportation on the Coastal Plain will be compatible with the North Slope's fish and wildlife resources and the needs of subsistence users of those resources. This point was clearly demonstrated during my visit to Prudhoe Bay this summer. The Chamber's President, Dr. Richard Lesher, also visited the North Slope this summer and was equally convinced that oil and gas development would not adversely affect the Coastal Plain. In fact, technology and experience from North Slope activities will be used and improved in the Coastal Plain.

Because of the 10- to 15-year lead time required for oil and gas development in the Arctic, Congress must take steps now to encourage, with appropriate environmental safeguards, oil production on all of the most promising federal lands, particularly the Coastal Plain area. By leasing the Coastal Plain now, oil could come on line just as production from Prudhoe Bay, which provides more than 20 percent of U.S. domestic oil production, is declining. By waiting for the next oil shock before taking action to bolster domestic production, the U.S. increases the environmental risk for ANWR, as well as the risks to economic and national security. Authorizing the leasing of the Coastal Plain for oil and gas exploration and development could become America's insurance policy for tomorrow.

America's Energy Needs Are Growing, and Supplies Are Shrinking.

The U.S. relies on oil and natural gas to meet two-thirds of its energy requirements. The need for oil is growing; and efforts to develop alternative sources, such as synthetic fuels, have fallen short of expectations. Therefore, for the foreseeable future, oil must continue to be the principal fuel on which the nation depends.

The U.S. must find 32 billion barrels of domestic oil during the next 10 years to replace what is being used. In fact, three-quarters of the oil that the U.S. must have in the year 2000—just 13 years from now—still has to be found. Despite this fact, domestic oil production in the "lower 48" states, including offshore wells, has declined substantially during the past decade. In contrast, consumption is expected to continue to increase. Last year it grew by more than three percent, from approximately 15.7 million barrels to an estimated 16.2 million barrels per day, doubtless due to increased economic activity, population growth, lower prices, and perhaps other reasons.

Also troublesome to the Chamber is that American oil reserves, that portion of its resources that has been located with considerable certainty and that can be economically recovered with present technology, have been steadily shrinking. These are estimated to hit the lowest levels since shortly after World War II by 1990. All of the onshore basins in the U.S. with the greatest potential for giant fields have already been explored, except the Coastal Plain.

Since the U.S. began drilling for oil more than a century ago, it has produced about 50 percent of the estimated onshore oil and gas reserves and 20 percent of the estimated offshore reserves. Although America's Outer Continental Shelf, those lands beyond the three-mile state boundary, holds great promise, only 15 percent of all offshore drilling exploration wells have been successful. Because of this limited success, opening the potential oil and gas resources in the Coastal Plain for exploration and production is more important than ever.

Oil Imports Could Double by the Mid-1990's and Cost Billions of Dollars Annually.

In October, 1986, the National Petroleum Council (NPC) issued an interim report entitled U.S. Oil and Gas Outlook in which the NPC presented the U.S.'s near-term and longer-term oil import outlook as going from grey to "utterly black."

Specifically, in sharp contrast to 1985 when U.S. imports of crude oil and petroleum products were only 27 percent of domestic consumption, the NPC study projects that, depending upon whether future prices follow a relatively low or a relatively high path, the acceleration in the decline of future domestic production, accompanied by even moderate increases in consumption, could result in imports of 35 percent to 50 percent of consumption by 1990, 45 percent to 60 percent by 1995, and 50 percent to 70 percent by the year 2000.

To put these figures in perspective, when the Arab oil embargo began in 1973, the U.S. was importing about one-third of its oil—about six million barrels per day. Despite drastic increases in oil costs, imports continued to rise to almost 10 million barrels per day by early 1977. After that, oil imports gradually declined to less than four million barrels per day by early 1983. Since that time, however, imports have surged; and today the U.S. is importing more than 40 percent of its oil requirements.

According to the American Petroleum Institute (API), U.S. oil imports from the Persian Gulf have increased by more than 400 percent during the past year. These imports accounted for 16.6 percent of total U.S. imports in December 1986, versus only four percent in November 1985. This increased reliance on Persian Gulf oil seriously threatens the nation's energy and national security and raises concern about the security of energy supplies and the U.S.'s ability to continue to produce goods and services.

Petroleum imports represent a significant component of all U.S. imports. In 1983, 1984, and 1985, net payments for imported oil amounted to almost $53 billion annually--costing Americans an average of $1 billion per week. Imported oil payments continue to be one of the largest factors in the U.S. trade deficit; last year they amounted to about one-fourth. According to the Department of the Interior's report, production from the Coastal Plain could reduce foreign dependence on oil and gas by almost nine percent in the year 2005 and save Americans billions of dollars per year.

Unless steps are taken now to increase development of domestic petroleum resources, the U.S. will become continually more reliant upon foreign suppliers. The current situation in the Persian Gulf clearly underscores the need for the U.S. to develop its domestic resources.

Drilling for New Oil and Gas Is Critical Despite Current World Oil Surplus.

World oil prices are at their lowest in a decade, and oil companies—as a result of depressed earnings—are announcing reductions in their capital and exploration expenditures. Why then, with oil companies having less money to allocate, is it more important than ever that the entire Coastal Plain be made available for oil and gas exploration and development and not be declared "wilderness," i.e., permanently closed to exploration and development, as has been suggested?

Experience tells us that when prices fall, demand inevitably rises, production declines, and a surplus disappears. America should not be lulled by the current surplus of oil in the world market; it must think of the future. The recommendation of the Department of the Interior that Congress enact legislation declaring the entire Coastal Plain available for oil and gas leasing is sound. Industry must be allowed to invest its limited financial resources most efficiently, i.e., in areas with the greatest development potential. Otherwise, the incentive to explore for and produce new domestic supplies is diminished.

Unfortunately, the current talk of an oil "glut" has created the false impression that America need not worry about its petroleum or other energy supplies now or in the future. This has caused some to advocate that the U.S. delay energy development programs. However, those who propose the delay ignore the long lead time necessary for industry to find and produce energy sources. In the Arctic, this could mean as many as 10 to 15 years. They also ignore how the U.S.'s dependency affected it a decade ago and how it is affecting it now.

Other Benefits to the U.S. from Leasing the Coastal Plain.

Income to the U.S. Treasury and State of Alaska. Revenues generated by petroleum exploration and development in the Coastal Plain would benefit not only the federal and Alaskan state governments but also the economy throughout the U.S. The Department of the Interior's report predicts that the net national economic benefits from oil production on the Coastal Plain will total $8 billion (present discounted value). The State of Alaska would receive a share of the federal revenue and an estimated $3.6 billion in tax payments related to leasing. In 1984, Alaska received about $1.4 billion in oil and gas royalties, rents, and bonuses.

Creation of Job Opportunities. Another benefit that would accrue from oil and gas operations in the Coastal Plain is a boost in employment nationwide because supplies and services for such operations come from throughout the nation. Depending upon the amount of oil and gas discovered on the Coastal Plain, the API predicts that national employment gains would range from 138,000 to 1,021,000 jobs.

Environmental Concerns.

It cannot be overemphasized that the human use of the Coastal Plain's resources must not be allowed to diminish its aesthetic and refuge values. The Chamber strongly supports the provisions in S. 1217 that authorizes the Secretary of the Interior to impose necessary and appropriate measures to protect refuge resources and ensure coordinated and efficient oil and gas activities. It recognizes that developing the entire Coastal Plain could have some environmental consequences and would eliminate the "wilderness" character of that area. However, the most adverse effects could be mitigated by using the lessons learned and the technology acquired from development at Prudhoe Bay and from construction of the Trans-Alaska Pipeline. The evidence there showed that petroleum operations are compatible with the conservation of the land's natural values.

In discussing whether oil and gas operations should be permitted on the Coastal Plain, it is important to remember that the Coastal Plain is only one component of an almost 90 million-acre National Wildlife Refuge System. By law, any activity occurring in a national wildlife refuge must be "compatible with the principles of sound wildlife management and will otherwise be in the public interest" (50 CFR Section 32.1). Experience in other refuges shows such compatibility.

A recent survey of oil and gas activities in 43 refuges in the contiguous 48 states, including 19 refuges with oil and/or gas production, found that oil and gas operations had little or no adverse effects on refuge wildlife or on other economic or recreational uses. This has also been true in Alaska in the Kenai National Wildlife Refuge and in sensitive areas of the North Slope.

Forty years of experience on the North Slope have demonstrated that oil development can and does exist in harmony with the environment. Techniques used to minimize disturbance include directional drilling, smaller and consolidated facilities, winter construction, use of temporary ice roads, use of special equipment, and elevated pipelines and facilities.

All activities on the Coastal Plain would be monitored by the Fish and Wildlife Service, the State of Alaska, and the North Slope Borough. Moreover, if oil and gas exploration is allowed in the Coastal Plain, only a few, temporary drill sites of less than 10 acres would be required to verify commercial reserves of hydrocarbons. And, if a discovery is made, only a small area of the refuge would be developed.

According to API, the operating area in the Coastal Plain of a field the size of Prudhoe Bay would cover 130,000 acres, which would be about 8.5 percent of the Coastal Plain. The actual surface area affected by pads, roads, etc. would be approximately one percent of the operating area, less than 0.1 percent of the Coastal Plain.

Millions of acres in Alaska already have been leased and explored, and now the Coastal Plain clearly has the most potential for major oil production. Exploration for oil and gas must take place where oil and gas may be located, not where we would like for them to be. With the rapid rate at which our reserves have declined, exploring the most promising areas first only makes sense. The Coastal Plain should be explored because it combines maximum potential with good access and an established nearby transportation facility.

Alaska already has vast "wilderness" areas. The Chamber believes that to withdraw such a prospect as the Coastal Plain for only a 2.6 percent addition to wilderness areas is not in the nation's best interests.

Conclusion

Development of the Coastal Plain should not be an either/or question. The U.S. can meet its energy needs and provide a wilderness legacy for the future. S. 1217 provides for both.

Chamber members well remember the gas shortages and curtailments of the 1970's, resulting from the Iranian oil supply cutoff. Schools and factories were closed, and people were layed off.

The U.S. easily once again could find itself vulnerable to the shortages and price increases of a decade ago. Congress must not be lulled by the current oversupply of oil into neglecting the opportunity presented by the Coastal Plain.

The Chamber urges the Committee to report legislation promptly that will permit the exploration, development, and production of the Coastal Plain's oil and gas resources in an expeditious and environmentally sound manner.

Senator BUMPERS. Thank you very much.

Mr. Matthews.

STATEMENT OF CHARLES D. MATTHEWS, PRESIDENT, NATIONAL OCEAN INDUSTRIES ASSOCIATION

Mr. MATTHEWS. Thank you, Mr. Chairman.

I am President of the National Ocean Industries Association, an association of more than 325 member companies with headquarters in 34 States, including Arkansas, and the District of Columbia, and plant locations and operations in all 50 States.

NOIA supports S. 1217 and petroleum development in the ANWR coastal plain. We believe such exploration of development operations in ANWR are vital to America's energy and economic future because it is one of the Nation's last best hopes for finding major new hydrocarbon discoveries on this continent. If the United States is to free itself of dangerous oil dependence on oil imports from unstable foreign sources, we must move ahead with development of the ANWR coastal plain.

With more than 20 years of petroleum development experience on Alaska's north slope, we know this can be done without harm to the caribou and other wildlife in the area. The operation can and will be carried out in a manner totally compatible with the sensitive arctic environment. There is no justification for delaying or prohibiting ANWR operations for environmental reasons.

The vitally needed ANWR development will help America's energy needs in the 1990s and beyond and will bring important economic benefits in terms of jobs and business for virtually every state in the union. Based on ANWR peak production of 350,000 to 2.7 million barrels of oil daily, it has been estimated that employment gains would range from 138,000 jobs to more than one million jobs.

ANWR development will bring increased Federal revenue from leasing bonuses, rents and royalties that can help reduce the serious budget deficits so harmful to our national economy. The revenues could be significant. For example, in 1984 alone Alaska received some $1.4 billion in oil royalties, rents and bonuses from leases on its own lands.

Between 1980 and 1986 the private sector spent more than $10 billion and a half on development of the north slope oil fields. Every State in the Union took part in supplying goods and services. The share of business ranged from $3.4 billion spent in Texas to $1.8 billion in California, $1.3 billion in Alaska, $300,000 in New Hampshire, $200,000 in West Virginia. And most of the States of the Nation or all of the States will receive benefit. And I assure you, Mr. Chairman, that Arkansas will directly, financially benefit by jobs and by products going to the north slope if this development is allowed.

NOIA member companies have benefited greatly from previous Alaskan oil field development. A new field the size thought to lie beneath the ANWR coastal plain would have positive effect on the oil and gas service industry and would help offset the downturn recently caused by depressed oil prices. The economic benefits to the entire Nation would be significant and it should be a major factor in this discussion.

Crude oil from the north slope producing fields already contributes 20 percent of U.S. oil production. America's dependence on foreign oil could increase markedly in the years ahead. As the older fields in the lower 48 States reach peak production and start to decline, as they already have, it is Alaska's undiscovered oil and gas that the Nation must turn if our future energy security is to be assured.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Matthews follows:]

NATIONAL OCEAN INDUSTRIES ASSOCIATION
1050 Seventeenth Street, N.W., Suite 700 Washington, D.C. 20036
(202) 785-5116

STATEMENT BY

CHARLES D. MATTHEWS
PRESIDENT
NATIONAL OCEAN INDUSTRIES ASSOCIATION

on
S. 1217

a bill to authorize oil and gas leasing, production, and development in the Coastal Plain of the Artic National Wildlife Refuge, Alaska

Before the

Senate Committee on Energy and Natural Resources

October 22, 1987

Washington, DC

Thank you, Mr. Chairman, I am Charles D. Matthews, President of the National Ocean Industries Association (NOIA). NOIA is a national trade association based in Washington, D.C. with more than 325 member companies. Each of these companies is engaged in one aspect or another of discovering and developing our nation's offshore oil and gas resources. Our member companies are headquartered in 34 states and the District of Columbia and have plant locations or operations in all 50 states.

NOIA supports S. 1217 which would allow oil and natural gas leasing in the Arctic National Wildlife Refuge (ANWR) coastal plain. We believe such exploration and development operations on the coastal plain are vital to America's energy and economic future. There is a general concensus among knowledgeable people that one of the nation's best hopes for major new oil and gas discoveries is in the ANWR coastal plain because industry activity to date indicates that significant petroleum reserves may be found there and extend out under the Beaufort Sea. The uncertainty of dependency upon oil supply emanating from the Middle East, and its destabilizing effect on the U.S. economy, are evident and historically proven facts. If the United States is to free itself of a dangerous overdependence on oil imports from those sources, we must move ahead with the task of finding and developing the potentially vast oil and gas resources beneath the ANWR coastal plain.

Based on the more than 20 years of petroleum industry experience on Alaska's North Slope, we have no doubt that oil and gas operations can be conducted on the ANWR coastal plain without harm to the caribou or other wildlife of the area. The operations can and will be carried out in a manner totally compatible with the sensitive arctic environment. We are not talking theory or concept here. We can cite examples of high standards and time-tested safeguards as well as a record of producing new technologies which enable industry to manage production in the arctic environment competently. We see no environmental justification for delaying or prohibiting oil and gas operations on the ANWR coastal plain.

The vitally needed oil and gas development will help meet America's energy needs in the 1990s and beyond. Development will also bring important economic benefits in terms of jobs and business for virtually every state in the union. The American Petroleum Institute has estimated that, based on ANWR coastal plain peak production between 350,000 and 2.7 million barrels of oil daily, projected employment gains would range between 138,000 to more than 1 million jobs, and the gross national product would increase from 0.14 percent to 1.01 percent above the levels that would otherwise be the case.

ANWR development will also mean increased funds from leasing bonuses, rents, and royalties for the federal government that can help reduce the serious budget deficits so harmful to our national economy. These significant benefits are frequently overlooked in our discussion of the need for Alaska oil and gas development. The distribution of the potential revenues among the federal, state, and local governments depends on the details of how the area is leased. But the resulting revenues would be significant -- in 1984 alone, Alaska received some $1.4 billion in oil royalties, rents and bonuses from leases on its own lands.

As an obvious example of these benefits to the private sector, major oil companies operating on the North Slope between 1980 and 1986 spent more than $10.5 billion in the United States on the development of those oil fields. Every state in the union took part in supplying goods or services; the share of the business ranged from $3.4 spent billion in Texas, $1.8 billion in California, $1.3 billion in Alaska to $300,000 in New Hampshire, and $200,000 in West Virginia.

While discoveries in ANWR would add significantly to the U.S. petroleum reserve base, other economic benefits throughout the nation are undeniable. NOIA member companies greatly benefitted from previous Alaskan oil field activity. A new field of the size thought to lie beneath the ANWR coastal plain would very positively affect the oil and gas service industry in such a way as to help offset the recent downturn caused by depressed oil prices. The "trickle down" theory of economic effects aptly applies to oil and gas exploration and development of the ANWR coastal plain. The economic benefits to be reaped by the entire nation should be a significant factor in this discussion.

Crude oil from the North Slope's producing fields is already contributing about 20 percent of U.S. oil production. America's dependence on foreign oil could increase markedly in the year's ahead, as the older fields in the lower-48 states reach peak production and start to decline -- as many already have. It is to Alaska's undiscovered oil and gas that the nation must turn, if our future energy security is to be assured.

In summary, NOIA believes that the opening of the ANWR coastal plain to oil and gas leasing, exploration, and development is a positive step for many sectors of U.S. industry. The benefits of successful ANWR coastal plain development would be felt nationwide by increases in jobs in many diverse industries. This is a critically important step that must be taken if our nation is to have the more secure energy source it needs for the decades to come; a source free from the threat of future supply disruptions. At a time of continuing -- and perhaps escalating -- political chaos and war in the Middle East, we have no choice but to find and develop the oil and gas resources within our own borders. The ANWR coastal plain is one place to start.

Senator **Bumpers**. Thank you very much.
Mr. Robinson.

STATEMENT OF CARLTON C. ROBINSON, EXECUTIVE VICE PRESIDENT, HIGHWAY USERS FEDERATION FOR SAFETY AND MOBILITY

Mr. **Robinson**. Senator Bumpers, I'm Carlton Robinson, the Executive Vice President of the Highway Users Federation for Safety and Mobility. As our statement indicates, we are a federation of those who use and supply highway transportation in this country.

The federation has consistently supported such environmentally sound, domestic energy exploration and development as is proposed by Senate 1217 based on two very fundamental facts. One, the economy of the United States depends on efficient and reliable transportation of people and goods. And two, such transportation is absolutely dependent on petroleum and will remain so for the foreseeable future.

If our population is going to continue to grow, if our jobs are going to continue to grow, if our economy and our standard of living are going to continue to grow, so then must transportation, and with it a suitable fuel supply.

The economic shock resulting from the oil shortages of the 1970s must not be forgotten, particularly when as much as one-third of our current supplies are derived from foreign sources.

Given the potential for oil discoveries under the coastal plain of ANWR, coupled with the anticipated declines in other domestic production, the lead time required for arctic oil exploration, we urge prompt congressional action to open one small part of the 18 and a half million acres of ANWR to sensible environmentally sound development.

And Mr. Bumpers, I think maybe we have beaten our 1 o'clock deadline.

[The prepared statement of Mr. Robinson follows:]

Highway
Users Federation
FOR SAFETY AND MOBILITY

Statement of

Carlton C. Robinson

Executive Vice President

HIGHWAY USERS FEDERATION

before the

Committee on Energy & Natural Resources

United States Senate

on S.1217

"Arctic Coastal Plain Public Lands

Leasing Act of 1987"

October 22, 1987

1776 Massachusetts Avenue, N.W. Washington, D.C. 20036-1993 (202) 857-1200

I am Carlton C. Robinson, Executive Vice President of the Highway Users Federation for Safety and Mobility, a long-standing coalition of businesses, industries and associations who support America's highway transportation system. Our membership consists of more than 400 companies and associations representing 27 industrial and commercial categories, who are the primary suppliers of highway transportation services and products as well as the major users of the nation's highways. The Federation has affiliated highway users groups in every state.

The Highway Users Federation appreciates this opportunity to comment on S. 1217, The Arctic Coastal Plain Public Lands Leasing Act of 1987, which addresses an issue of great concern for Highway Users and, indeed all Americans -- the continued exploration for, and development of, domestic petroleum supplies.

The Federation has consistently supported such environmentally sound domestic energy exploration and development as proposed in this legislation, based on two fundamental facts: (1) the economy of the United States depends on efficient and reliable transportation of people and goods; and (2) such transportation is absolutely dependent on petroleum and will remain so for the forseeable future.

Each year our society becomes more motor vehicle dependent. 1.8 trillion vehicle miles were traveled in 1985. By the year 2000, that total will reach 3 trillion.

Demographic and economic shifts continue which have long term effects on national transportation needs. If the population is going to continue to grow, if jobs are going to continue to grow, if our economy and standard of living are going to continue to grow, then so must transportation, and with it, a suitable fuel source.

Though the motoring public continues to enjoy adequate and competitively priced fuel supplies, the economic shock resulting from the oil shortages in the 1970's must not be forgotten; particularly when as much as 1/3 of current supplies are derived from foreign sources, and are therefore vulnerable to interruption or embargoes. Increased domestic supplies would protect the national economy from the damage which would be inflicted by any sudden reduction in the availability of imported oil.

Given the potential for oil discoveries under the coastal plain of the Arctic National Wildlife Refuge (ANWR), coupled with anticipated declines in other domestic production and the lead times required for arctic oil exploration, we urge prompt Congressional action to open the Coastal Plains.

Senator **Bumpers**. We have thanks to your very kind cooperation.

We appreciate very much all of you being here. And as I say, those of you who didn't complete your statements, your statements will be inserted in the record. We appreciate, Ms. Moya and Ms. Tapia, gentlemen, your feelings and testimony about this, all of which is very persuasive. We thank all of you for coming—some of you long distances—to be with us this morning.

This is not a witness-for-witness hearing. It is an immensely complex issue, which I am sure parties on both sides fully comprehend and understand. We thank you again for being here.

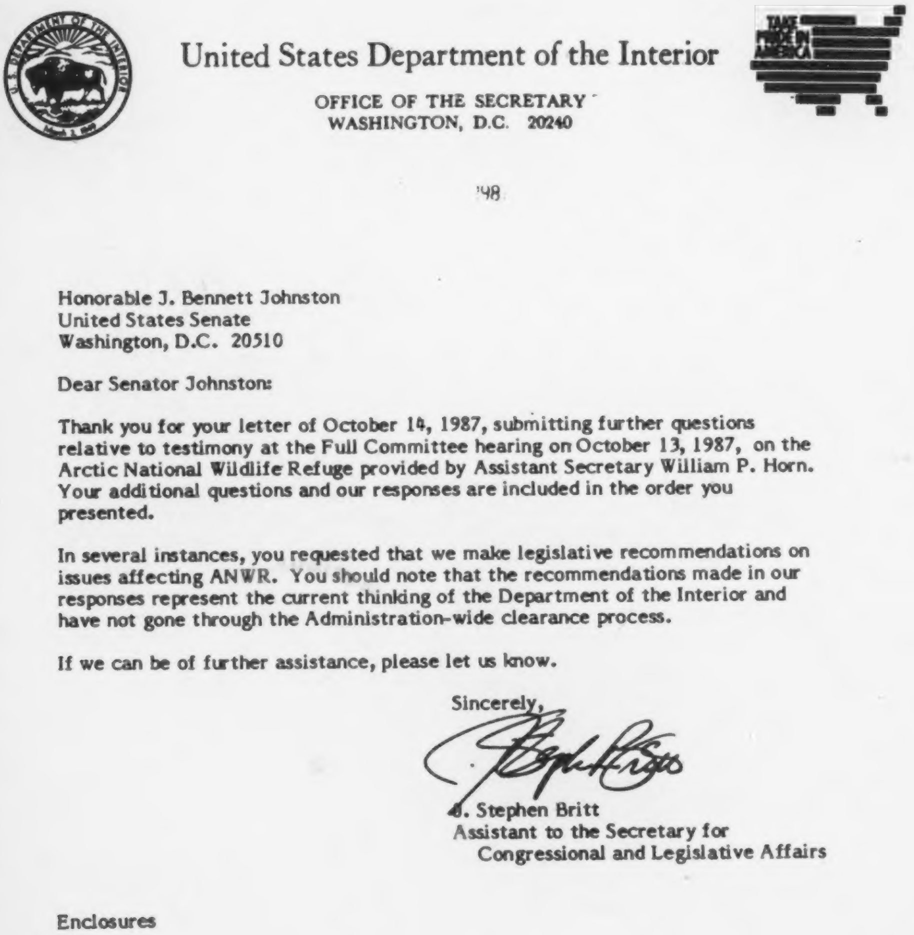
We will stand in recess until the Chairman next calls us.

[Whereupon, at 12:47 p.m., the hearing recessed, subject to the call of the Chair.]

APPENDIXES

APPENDIX I

Responses to Committee Questions



United States Department of the Interior

TAKE PRIDE IN AMERICA

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

48

Honorable J. Bennett Johnston
United States Senate
Washington, D.C. 20510

Dear Senator Johnston:

Thank you for your letter of October 14, 1987, submitting further questions relative to testimony at the Full Committee hearing on October 13, 1987, on the Arctic National Wildlife Refuge provided by Assistant Secretary William P. Horn. Your additional questions and our responses are included in the order you presented.

In several instances, you requested that we make legislative recommendations on issues affecting ANWR. You should note that the recommendations made in our responses represent the current thinking of the Department of the Interior and have not gone through the Administration-wide clearance process.

If we can be of further assistance, please let us know.

Sincerely,

J. Stephen Britt
Assistant to the Secretary for
Congressional and Legislative Affairs

Enclosures

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

DALE BUMPERS, ARKANSAS
WENDELL H. FORD, KENTUCKY
HOWARD M. METZENBAUM, OHIO
JOHN MELCHER, MONTANA
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DARYL H. OWEN, STAFF DIRECTOR
D. MICHAEL HARVEY, CHIEF COUNSEL
FRANK M. CUSHING, STAFF DIRECTOR FOR THE MINORITY
GARY G. ELLSWORTH, CHIEF COUNSEL FOR THE MINORITY

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510-6150

October 14, 1987

Honorable William P. Horn
Assistant Secretary for Fish and Wildlife
and Parks
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Horn:

Thank you for your testimony at the Full Committee hearing on October 13, 1987. I have enclosed several questions to be answered in writing for inclusion in the hearing record. Please submit your responses to these questions to us by Monday, October 26, 1987.

Sincerely,

J. Bennett Johnston

J. Bennett Johnston
Chairman

JBJ/dmn

ADDITIONAL QUESTIONS FOR ASST. SECRETARY HORN

1. Your testimony refers to the 29 mitigation measures contained in the 1002 report.

   a. The 29 mitigation measures contained in the 1002 report are a summary. Please provide the detailed mitigation measures that would be proposed.

   b. Would the Department propose to abide by those mitigation measures in any ANWR leasing program?

2. Your testimony says,

   > "We would propose site-specific, detailed stipulations for the various oil and gas related activities in accordance with these principles during the NEPA process for the leasing activity in question."

   a. What do you mean by that statement? Please explain in detail.

   b. Have you developed such detailed stipulations? If so, please provide them.

3. Please provide a detailed comparison of the mitigation measures proposed in the 1002 report and the stipulations included in the KIC lease.

4. In the absence of a new provision in the ANWR legislation, what statute would govern liability for oil spills during exploration, development, or production? Does the Department believe the statutory requirements provide adequate protection in the case of an oil spill or would you suggest that additional statutory requirements be imposed?

5. You suggested that the Department be given new statutory authority for leasing pipeline rights-of-way across the 1002 area.

   a. Would the provisions of FLPMA (43 U.S.C. 1761, 1763) pertaining to rights-of-way and utility corridors govern in the absence of new statutory provisions?

   b. What amendments to those provisions, or other statutory authority, would you suggest be included?

6. What type of provision does the Department support, as a limitation on judicial review of the Final LEIS as the

programmatic EIS for the leasing program? Please provide specific statutory language.

7. Does the Department support any other provisions limiting judicial review of the Secretary's decisions in subsequent steps of the ANWR process -- leasing, exploration, and production?

8. Please provide the statutory language for amendments to S. 1217 covered in your testimony, and any other amendments the Department supports.

9. Your statement says,

> "... we propose to comply with NEPA for each subsequent step of the process -- leasing, exploration, and production."

a. Based upon your understanding of the NEPA requirements, what does that mean?

b. At which specific stages in the process would you intend to prepare an environmental assessment?

c. At which specific stages in the process would you intend to prepare a full-fledged EIS?

d. Would the EIS process require you to consider the option of not issuing leases for a specific area?

e. When would public hearings be held?

f. How long would the process take at each stage?

g. At which specific stages in the process would the Secretary's decision to proceed, or not to proceed, be subject to judicial review?

h. Please provide the Committee with a copy of the relevant administrative guidelines governing the NEPA process.

10. Please provide the Committee with a detailed explanation of the "404" permit and consultation process.

a. What is the statutory basis for the process?

b. What administrative requirements govern the proces?

c. Are state and local officials included in the process? What sort of veto, concurrence, or other decision-making authority do they have during the process?

Additional Questions for Department of the Interior Witness
Submitted by Senator Johnston

1. What diligent development requirements do you think should apply to leases on the Coastal Plain?

2. Do you believe unitization of leases should be required on the Coastal Plain?

   - If so, please describe the unitization requirements you would impose and the circumstances under which they would be applicable.

3. Do you think that any ANWR leasing legislation should provide the Secretary with lease cancellation authority?

   - If so, please describe the terms and conditions for cancellation that you think would be appropriate.

4. Your testimony recommends that the Secretary have authority to require that there be no unnecessary duplication of facilities on the Coastal Plain. What specific provisions would you recommend?

5. Do you have recommendations for minimizing the impacts of production support facilities, including facilities of service companies, such as those presently located in Deadhorse?

6. Do you have recommendations for minimizing the impacts and duplication of transportation facilities?

7. What environmental criteria are applied in determining which areas of the Outer Continental Shelf will be made available for leasing and the order in which such areas will be made available?

   o Does the Department have any specific procedures or guidance with respect to application of these criteria? If so, please provide copies to the Committee.

8. You have provided the Committee with the land use stipulations for the ASRC Lands, Kaktovic, Alaska, and the draft operation stipulations for the Koniag ANWR Interest lands. Does the Department take the position that those stipulations are sufficient to adequately protect the environment of the Coastal Plain?

   o What recommendations, if any, does the Department have to improve these stipulations?

9. You made some references in your oral testimony not included in your prepared text regarding the relationship between any ANWR leasing legislation and the compatibility determination provisions of the National Wildlife Refuge Administration Act.

Could you please restate your position and elaborate on that point?

10. How big is the Sadlerochit Springs special area where you propose no surface occupancy? Are you aware of any other areas in the Coastal Plain that would be treated similarly?

11. I agree with your general proposition that all applicable Federal and State environmental laws should apply to leasing in ANWR. Given this position, why would you propose that rights-of-way in ANWR be issued without regard to the existing access provisions of Title XI of the Alaska Lands Act?

12. With regard to leasing systems to be used in ANWR, you say that you do not object to having the discretionary authority to use all of the methods permitted in the OCS Lands Act.

Isn't it true that some of these leasing systems, for example work commitment bidding, could result in little or no revenue to the Treasury?

13. Would you propose to offer all of the Coastal Plain of ANWR for leasing at once of would it be opened in stages?

ADDITIONAL QUESTIONS FOR ASST. SECRETARY HORN

1. Your testimony refers to the mitigation measures contained in the 1002 report.

a. The 29 mitigation measures contained in the 1002 report are a summary. Please provide the detailed mitigation measures that would be proposed.

b. Would the Department propose to abide by those mitigation measures in any ANWR leasing program?

ANSWER:

a. More detailed proposed mitigation measures were included at the end of each impact assessment for each alternative in Chapter VI of the report. They have been broken out and are attached for your convenience, by alternatives A and B and element being assessed. These will be applied on a site-specific basis as explained in the answer to question 2.

b. As stated in the "Assumptions" section of the report (page 109), it is assumed that these mitigation measures, as appropriate, or measures at least as effective, would be included in plans for development, construction and operation.

2. Your testimony says,

> "We would propose site-specific, detailed stipulations for the various oil and gas related activities in accordance with these principles during the NEPA process for the leasing activity in question."

a. What do you mean by that statement? Please explain in detail.

b. Have you developed such detailed stipulations? If so, please provide them.

ANSWERS:

a. The Department and the Fish and Wildlife Service would undertake early and continuous consultation and coordination with the leaseholder, permittees and State and Federal agencies from the start of planning. Through this process, performance standards would be developed for safety and environmental requirements. Site-specific mitigation measures, including design and construction techniques, would be addressed early in planning to ensure no unnecessary adverse effects and no duplication of facilities. These measures would be instituted in stipulations required in permits and in other authorizations required from regulatory agencies.

b. Detailed stipulations have not been developed since they would be done on a very specific, case-by-case basis, tailored to meet the needs of each particular phase of development and precise location on the coastal plain.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A--FULL LEASING

Effects on Physical Geography and Processes

GEOLOGICAL AND GEOPHYSICAL EXPLORATION

Mitigation

Surface effects of seismic surveys can be minimized by confining operations to the winter after the active soil layer is frozen to a depth of at least 12 inches and the average snow depth is about 6 inches. Seismic trains are generally routed through terrain where it is easier to move equipment, so potential for surface damage is minimized even though the routing may not provide the shortest travel distance. Gently sloping banks would be selected for the entry to and exit from all stream crossings, to reduce equipment strain and avert bank damage which could cause erosion and stream siltation. This is important on the 1002 area where, even though the topographic relief is not great, streambanks are steep along many drainages.

No ice roads or airstrips would be constructed to support seismic operations. Light, fixed-wing aircraft would be used for resupply, landing on 2,000-foot-long ice airstrips scraped on the nearest lake or pond. Ski-equipped aircraft can be landed on the snow-covered tundra if there are no [illegible] lakes nearby.

~ EXPLORATORY DRILLING ~

Mitigation

The use of double liners in reserve pits for both exploration and development wells is advantageous in adequately containing pit materials. When drilling is completed, the reserve pit could contain formation cuttings; drilling muds composed of barium, bentonite, and heavy metals (particularly iron, manganese, zinc, chromium, lead); salts (principally sodium chloride and potassium chloride); alkali (mainly calcium and magnesium bicarbonates); and possibly some liquid hydrocarbons. Detergents, biocides, and defoaming agents may also be present in the reserve pits, together with fillers, such as ground walnut shells. The amount of water introduced from snow that has blown into the pit depends on snow and fluid management practices.

Alaska solid waste regulations require the closeout of reserve pits at abandoned exploratory and development sites. Effective closure of these pits requires stabilizing the waste material (by drying), freezeback, filling, and providing an impermeable gravel cap to prevent leaching, as well as monitoring.

The accepted method for abandoning an exploratory well reserve pit is to inject the unfrozen fluid down the annulus of the well at the time drilling is completed and then fill the reserve pit with enough material so that the drilling mud and frozen fluid become a part of the permafrost. On the North Slope about 5 feet of cover material is required. If revegetation can be accomplished over the reserve pit, less fill is required to insulate the pit contents, due to the insulating properties of vegetation. Construction equipment is usually required to blade or haul fill material into the pit. The most successful technique for revegetation involves saving the top organic layer of the tundra when the reserve pit is excavated. This layer is then replaced when the pit is filled and abandoned.

~ DEVELOPMENT AND PRODUCTION ~

Mitigation

Gravel requirements would be reduced by use of gravel-foam-timber pads where feasible. Gravel removal should be prohibited from active fish-bearing watercourses and their tributaries. Proper insulation should reduce permafrost degradation.

To ensure maintenance of water quality in the vicinity of drilling and production pads, drilling muds, cuttings and other wastes should be reinjected where geologically feasible. Reserve pits should be double-lined or otherwise rendered impermeable. Construction of "reservoirs" as a byproduct of gravel extraction could augment fresh-water availability.

Because reserve pit fluids would be minimized through water conservation, reuse, and reinjection, large quantities of these fluids would not be available for road watering to control dust. This will minimize contamination of adjacent tundra vegetation by the chemicals found in such fluids.

To reduce stream pollution, transportation crossings should be limited and permanent facilities should not be placed within 3/4 mile of the high-water mark of specified watercourses, determined on a site-specific basis.

All sources of air pollution in the 1002 area, whether or not they are related to oil and gas activities, must comply with applicable Environmental Protection Agency (EPA) and State of Alaska air pollution control requirements. It is, therefore, expected that these requirements are sufficient to ensure that any emissions generated in the 1002 area (or from related activities elsewhere) will not cause a significant deterioration of air quality.

Prior to any development, air-quality background data, chemical composition data on the crude oil to be produced, and data on sensitive vegetation should be gathered. These data together with air-quality modeling data are presented by unit producers to obtain a PSD (prevention of significant deterioration of air quality) permit. Under a cooperative agreement with the FWS, the National Park Service evaluates technical data in relation to Clean Air Act Section 165 standards for National Wildlife Refuge areas. If it is determined that deterioration will exceed these standards using proposed emission equipment, a permit is not issued. The PSD permit process thus guards against unacceptable levels of adverse air quality impacts.

ARCO's recently installed Central Gas Facility in Prudhoe Bay contains improved flare equipment and has resulted in greatly improved combustion at that facility. These recent improvements in flare design should reduce potential air-quality degradation during emergency gas-flaring activities.

Effects on Biological Environment

VEGETATION, WETLANDS, AND TERRAIN TYPES

GEOLOGICAL AND GEOPHYSICAL EXPLORATION

~ Mitigation ~

It is assumed that summer seismic exploration would not be permitted, and ice-road placement would continue to be prohibited in the same location 2 years in a row. Multiple vehicle passes over the same route should be avoided in all cases. Stipulations governing surface activities for the seismic programs in 1983-84 and 1984-85 (50 CFR Part 37) would also result in avoidance or minimization of impacts to vegetation.

EXPLORATORY DRILLING, DEVELOPMENT, AND PRODUCTION

~ Mitigation ~

Effects on vegetation could be reduced by appropriate facility design and operation. Facilities should be consolidated as much as possible to avoid unnecessary direct loss of acreage. Culverts should be carefully designed to preclude impoundment problems. Traffic speed controls will reduce dust deposition. Reinjection of drilling muds and other fluids, and careful construction will help reduce toxic spills. Appropriate containment procedures and absorbent pads must be used to minimize and clean up any fuel, sea-water, or other spills which did occur. Effective cleanup procedures for spills and subsequent revegetation efforts can reduce the amount of vegetation originally affected and the length of time needed for recovery (McKendrick and Mitchell, 1978; Johnson, 1981; Pope and others, 1982; Brendel, 1985).

Rehabilitation of disturbed sites may partially restore lost habitat. Complete restoration may not be possible, inasmuch as construction activities dramatically alter surface features which determine plant species composition in the natural habitat. Several literature reviews of revegetation in Alaska have concluded that areas north of the Brooks Range are the most difficult to revegetate, and successful rehabilitation techniques have not yet been developed for these areas (Johnson and VanCleve, 1976; Johnson, 1981; Kubanis, 1982; Oakley, 1984).

Careful siting of petroleum exploration and development facilities and activities would be required to prevent disturbance of Thlaspi arcticum plants and their habitat. Some indirect plant loss might result from dust deposition. This species is currently under review to determine if it qualifies as a threatened or endangered plant (category 2 candidate—45 FR 82480). The widest known distribution of Thlaspi arcticum in the Arctic Refuge is along the Katakturuk River (pl. 1A), adjacent to potential economic prospects in Block A. Further study to better define the locations and numbers of Thlaspi arcticum plants occurring on the 1002 area, in conjunction with careful siting of pads and routing of collecting lines and associated roads in Block A, would avoid most impacts to that species.

~ SPECIAL TERRESTRIAL AND AQUATIC ENVIRONMENTS ~

SADLEROCHIT SPRING SPECIAL AREA

Mitigation

The existing "no surface occupancy" restriction for oil exploration and development should remain in effect. This precludes surface development and disturbance, thereby maintaining the area's physical features and important fish, wildlife, and subsistence resource values.

KONGAKUT RIVER-BEAUFORT LAGOON

Mitigation

Limiting surface occupancy in the zone from the coastline inland 3 miles would effectively mitigate impacts within this area.

ANGUN PLAINS

Mitigation

Gravel extraction should be limited. Any proposal for gravel extraction within this area would be evaluated for possible adverse impacts on the geologic features which make this area unique.

JAGO RIVER

Mitigation

It is recommended that the need for establishing "Research Natural Areas" on the North Slope be reviewed and specific locations (if any) within the Jago River drainage that meet these needs be identified.

COASTAL AND MARINE ENVIRONMENT

Mitigation

Experience gained from construction and operation of docks and causeways for Prudhoe Bay should be used to plan and construct similar facilities for the 1002 area so that longshore water transport and lagoon water chemistry are not affected or fish movements impeded. Release of fuels and other hazardous substances should be minimized by developing and implementing control, use, and disposal plans for such substances.

TERRESTRIAL MAMMALS

~ CARIBOU ~

Exploration Mitigation

Disturbance from exploration activities could be minimized and habitat values maintained by implementing environmental protection measures used during the previous seismic exploration program on the 1002 area (50 CFR 37.31) and the stipulations for exploration drilling on KIC/ASRC lands (agreement between ASRC and the United States, Appendix 2, Land Use Stipulations, Aug. 9, 1983). Oil exploration, except surface geology, should be limited to winter, generally November 1 to May 1, when most of the CAH and usually all the PCH are off the 1002 area.

Effects of Habitat Modification.

Mitigation of Effects of Habitat Modification.--These acreage figures were developed in consideration of mitigation measures that would require consolidated facilities siting and other measures to reduce the amount of actual acreage required. Careful road design and adequate culvert placement should ameliorate changes in surface water flow. Enforcement of speed limits and other traffic controls should reduce gravel spray and roadside dust deposition. Proper road maintenance should further minimize gravel spray and effects of altered snowmelt on adjacent vegetation.

Effects of Displacement and Disturbance.-

Effects on Calving from Displacement/Disturbance.-

Mitigation for Effects on Caribou Calving.--Nonessential development facilities should be located outside concentrated calving areas and riparian habitats (pl. 2A). Essential facilities (drill pads and associated pipelines/roads) should be consolidated so as to minimize acreage requirements, and should be constructed and maintained to minimize disturbance. Time and area closures should be established, or restrictions on activities and access imposed, during critical periods in areas of caribou concentration--for calving, approximately May 15-June 20. Off-road vehicle use should be prohibited within 5 miles of all pipelines, pads, roads, and other facilities, except for traditional use by local subsistence users. Methods to facilitate caribou passage at pipelines (as discussed in the insect-relief section below) would also facilitate access to calving habitats.

Recommendations for aircraft restrictions differ. According to Calef and others (1976), flight elevations of 500 feet AGL would prevent most injury-causing caribou reactions (for example, stampedes). Altitudes of 1,000 feet AGL would avoid mild escape responses. These investigators recommended aircraft altitudes of 1,000 feet AGL during calving, rut, and early winter. Davis and Valkenburg (1979), who also noted an inverse relationship between the altitude of aircraft and severity of caribou reactions, recommended altitudes of 2,000 feet AGL from May to August. Caribou of the Peary herd in Canada reacted similarly to helicopters (Miller and Gunn, 1979); altitudes of 2,000 feet AGL were recommended for May to November and 1,000 feet AGL at other times. The FWS does not have authority to regulate minimum flight altitudes, but can enforce aircraft harassment prohibitions.

Effects on Other Activities from Displacement/Disturbance.--

Mitigation for Effects on Other Activities.--Time and area closures should be established, restrictions on activities and access imposed, or traffic controlled during periods when caribou actively seek out insect-relief, forage, and predator-avoidance habitats--approximately June 20-August 15. Curatolo and Murphy (1983) suggested that caribou passage could be facilitated by separating pipelines from heavily traveled roads and constructing ramps at strategic locations over elevated pipelines. Other researchers have concurred (Curatolo and others, 1982; Robus and Curatolo, 1983; Elison and others, 1986). The optimum separation depends upon terrain. Preliminary information indicates that a separation of 400-800 feet improves crossing success (Curatolo and Reges, 1986). To permit use of coastal insect-relief habitats, all methods to facilitate caribou passage should be used, as appropriate and feasible (that is, elevating, ramping or burying pipelines; separating pipelines and roads; and implementing time and area closures, as well as access restrictions, for vehicles and activities).

From the coastline inland 3 miles, surface occupancy should be restricted to marine facilities and other infrastructure essential to support inland activities. Drill pads and production facilities could be allowed within the zone 1.5 to 3 miles from the coast, on a site-specific, case-by-case basis only.

~ MUSKOXEN ~

Mitigation

Negative effects on muskoxen could be mitigated by prohibiting disturbance and implementing necessary time and area closures similar to the measures described for caribou. Continued monitoring of the population's growth, distribution, movements, and behavioral responses would detect changes and determine what, if any, additional mitigation may be needed.

Because riparian areas are favored habitats, closure of important riparian areas to siting of permanent facilities and limiting crossings of those areas by transportation facilities would minimize potential interactions and disturbance, which would reduce effects on muskoxen (pl. 2C).

Increased hunting regulation and enforcement would be required to regulate harvest.

MOOSE

Mitigation

~ Mitigation would include protection of riparian willow habitats, limiting use of transportation corridors and closing the area within 5 miles of project facilities to the discharge of firearms. Moose harvest on the Arctic Refuge is regulated by the State of Alaska in cooperation with the FWS, and could be kept within sustainable limits by modifying harvest seasons and bag limits. ~

DALL SHEEP

Mitigation

More restrictive hunting regulations could be required if increased harvest affects the health of Dall sheep populations or reduces the quality of hunting and associated recreational use.

WOLVES

Mitigation

Measures designed for prey species such as caribou will also help reduce adverse effects to wolves. Enforcement of existing regulations by the State and the FWS would reduce potential effects of hunting. A few wolves might be killed for public safety (to combat rabies), with a minor effect on the population. Strict enforcement of prohibitions against feeding wildlife and providing adequate garbage handling would prevent wolves from becoming nuisances around camps, decreasing the probability of these animals being shot or trapped.

ARCTIC FOXES

Mitigation

No mitigation beyond that already outlined for other species is recommended.

WOLVERINES

Mitigation

Measures designed for prey species such as caribou, muskox, and moose will also benefit wolverines. Control of access and harvest to minimize direct mortality would be the most important determinant of effects. This control is recommended as mitigation for effects on several species.

BROWN BEARS

Mitigation

In addition to those measures listed earlier in the chapter, strict enforcement of prohibitions on feeding wildlife, adequate food storage, control of harvest, and control of aircraft flight altitudes and corridors would lessen adverse effects of development resulting from full leasing. An active program monitoring brown bears during seismic exploration, construction, and other development would help avoid disturbance of denning bears. Buffer zones of at least 1/2 mile would be established around any known dens as required for previous exploration (50 CFR 37.32 (c)).

ARCTIC GROUND SQUIRRELS AND OTHER RODENTS

Mitigation

No additional measures are recommended.

MARINE MAMMALS

POLAR BEARS

~ Mitigation ~

Some adverse effects on polar bears could be reduced by documenting den locations and use areas so that oil-development activities avoid them to the maximum extent possible. Avoidance of suitable denning habitat is most important. To prevent disturbance which could cause early den abandonment, buffer zones of at least 1/2 mile should be established around known dens, such as the zones described for brown bears (50 CFR 37.32 (c)). Conflicts with bears that do den on the 1002 area along the coast could be minimized by limiting construction activities during the denning period. Where possible, orienting seismic lines, pipelines, and roads at right angles to the coast in coastal areas could further minimize interference with bears coming ashore to den. Also, ice quality and movement data collected by industry should be made available to the FWS to augment research attempts to understand polar bear movements and behavior. Such data would be invaluable in learning how to predict and minimize adverse effects of industrial activities on polar bears.

If attracted by garbage, polar bears could become a nuisance or threat to personnel and would need to be relocated. Proper garbage control and fencing of camps would reduce this problem. Except for purposes of scientific research or other authorized takings, such as by Alaskan Natives, nuisance bears would have to be trapped and relocated as required by the Marine Mammal Protection Act of 1972. The exception would be extreme situations where other methods of humane taking are necessary for either the welfare of the animal or protection of the public health and welfare.

SEALS AND WHALES

Mitigation

No mitigation beyond that already outlined for other species is recommended.

BIRDS

SWANS, GEESE, AND DUCKS

Mitigation

Measures outlined for other species also apply to waterfowl: careful facilities siting and controls on surface activities, air transportation, and hunting. Reserve pit fluid discharges and other contaminants should be adequately controlled. Powerlines should be designed to minimize losses from bird strikes by burying, attaching to pipelines, or otherwise eliminating the need for poles. Increased hunting by workers in the area will occur but will be kept to a minimum level by the assumed prohibition of firearms discharge around development areas. The judicious placement of transportation corridors south of coastal nesting areas would be particularly important for tundra swans.

SEABIRDS AND SHOREBIRDS

Mitigation

Careful placement of facilities, restriction of transportation, and control of pollutants would minimize adverse effects on seabirds and shorebirds.

RAPTORS

Mitigation

Measures designed to reduce adverse effects on caribou during calving and postcalving could lessen effects of reduced prey for golden eagles. Siting and designing powerlines and towers to minimize potential strikes, as discussed for waterbirds, will reduce direct mortality to a minor effect. Restricting activities in known high-density nesting areas near Sadlerochit Springs and Bitty Benchmark would further minimize adverse effects of oil development. Specific mitigation measures are listed in the summary at the end of this chapter.

PTARMIGAN

Mitigation

To minimize habitat losses and disturbance in areas particularly important to ptarmigan, permanent facilities should not be located within a 3/4-mile buffer zone around identified riparian areas, as already recommended for other species.

PASSERINES

Mitigation

The 3/4-mile buffer zone for caribou would protect most of the riparian willow habitat important to many passerine species.

FISH

FRESH-WATER FISH

COASTAL FISH

Mitigation

Impacts on fish can be minimized by properly locating and designing road and pipeline crossings and constructing those facilities when fish are not concentrated in the area. Further mitigation should include carefully locating and constructing docks, causeways, and other water-based structures. All feasible methods to maintain water quality and quantity in fish-bearing rivers and streams should be used. Gravel removal and other stream alterations in important fish habitats should be restricted.

Appropriate containment procedures and spill contingency plans for oil and other contaminants will also reduce potential effects by minimizing direct mortality or reductions in invertebrate or aquatic plant food resources. Mitigation measures designed to adequately protect arctic char and arctic grayling will protect other fresh-water species. Proper culverting of road systems will reduce the potential to trap sticklebacks and other fish in areas that do not provide overwintering habitat. Season and creel limits may be adjusted to protect sportfish from overharvest if populations become stressed.

THREATENED AND ENDANGERED SPECIES

BOWHEAD AND GRAY WHALES

See previous discussion under Seals and Whales.

ARCTIC PEREGRINE FALCON

Mitigation

Mitigation would include controlling aircraft, noise, surface activities, and other disturbances within 1-2 miles of active nest sites April 15-August 31. Construction of permanent facilities or other long-term habitat alterations (materiel sites, roads, and airstrips) within 1 mile of historic nest sites would require special authorization by the FWS.

Approved handling procedures for chemicals and toxicants will permit few or no adverse effects from contaminants. As discussed for other bird species, transmission lines would be designed to minimize the potential for collisions.

Effects on Human Environment

POPULATION

~ SOCIOCULTURAL SYSTEM ~

Mitigation

Sociocultural impacts are very difficult to mitigate completely, but some steps can be taken to minimize them. The oil industry has developed plans in other areas of the Nation, in conjunction with residents of communities to be affected, to manage developmental impacts in the most desirable manner. An example would be providing chemical dependency and mental illness counseling to individuals. In addition, village and regional entities could be provided with professional guidance for actions to alleviate these problems.

EXISTING LAND USE

SUBSISTENCE USE

Mitigation

~ Measures previously recommended for fish and wildlife and their habitats will also mitigate adverse effects to subsistence harvest by Alaskan and Canadian villages by minimizing the direct loss and displacement of subsistence species. ~

Effects on Kaktovik subsistence uses can further be minimized by facility siting and design. Seasonal closures to prevent wildlife disturbances and other mitigation measures will also minimize adverse effects to subsistence.

Changes in policy regarding access and harvests near development sites would greatly mitigate adverse effects on Kaktovik subsistence uses. If Kaktovik residents were permitted to use the development infrastructure, including roads and airports, to increase accessibility to subsistence resources, the effect would be positive on their ability to harvest subsistence resources. Excluding development from traditional harvest areas and not restricting local residents' abilities to harvest resources from those areas would minimize adverse effects on continued subsistence use.

Restrictions to subsistence use resulting from reductions in species availability or altered distributions could be offset if access to other areas and resources were allowed.

NATIVE ALLOTMENTS

LAND STATUS AND MILITARY AND INDUSTRIAL USE

STATE AND LOCAL POLITICAL AND ECONOMIC SYSTEMS

PUBLIC SERVICES AND FACILITIES

ARCHEOLOGY

Mitigation

Because known archeological sites are small and precisely located, they can be easily avoided during construction and operation of nearby facilities. Before exploration or development work, contractors would be required to conduct archeological surveys in all areas that may be affected. Most, if not all, sites discovered in this process could be protected by avoidance. The preponderance of known sites and most likely the majority of undiscovered sites occur along the coast and major rivers, in areas that will be avoided for other reasons. Nonetheless, contractors will be required to exercise caution in their operations, and to cease activity when an archeological site is encountered until appropriate protective measures are adopted.

RECREATION, WILDERNESS, AND ESTHETICS

Mitigation

With careful planning and coordination for other reasons, each river should generally have only one crossing facility throughout its length. Negative effects on recreationists in the adjacent wilderness could be mitigated somewhat if, wherever possible, no facilities were placed within 5 miles of designated wilderness. Loss of the area's wilderness character cannot be mitigated where oil exploration and development occur.

ALTERNATIVE B--LIMITED LEASING

Effects on Physical Geography and Processes

Effects on Biological Environment

VEGETATION, WETLANDS, AND TERRAIN TYPES

Mitigation

As for Alternative A, consolidation of facilities, environmentally sensitive engineering, and control of toxic materials as described under full leasing could help reduce the area and magnitude of effects to vegetation and wetlands.

~ SPECIAL TERRESTRIAL AND AQUATIC ENVIRONMENTS ~

Mitigation

Limiting surface occupancy in the zone from the coastline inland 3 miles would effectively mitigate impacts in the Kongakut River-Beaufort Lagoon area. Gravel extraction should be limited in the Angun Plains. Any proposal for gravel extraction within this potential National Natural Landmark should be evaluated for possible adverse impacts to the geologic features which make this area unique. The need for Research Natural Areas on the North Slope should be reviewed and specific locations (if any) within the Jago River drainage that meet these needs should be identified.

COASTAL AND MARINE ENVIRONMENT

Mitigation

Environmentally sensitive construction of docks and causeways as well as proper management of fuel and other hazardous substances will minimize most adverse effects.

TERRESTRIAL MAMMALS

~ CARIBOU ~

Mitigation

All measures recommended for Alternative A (for example, pipeline design, limiting use of the infrastructure to development, environmentally sensitive siting of all facilities, time and area closures, access restrictions) would apply in avoiding, minimizing, or otherwise mitigating potential adverse effects to caribou.

MUSKOXEN

Mitigation

Because essentially the same muskoxen habitats would be affected by limited development, mitigation recommendations would be identical to those for full development.

MOOSE

Mitigation

No mitigation is necessary beyond those measures recommended under full leasing.

DALL SHEEP

Mitigation

As for full leasing, more restrictive hunting regulations could be required.

WOLVES

Mitigation

Measures for adequate garbage control and enforcement of hunting regulations would be required as for full development.

ARCTIC FOXES

Mitigation

No additional mitigation beyond that recommended for other species would be needed to reduce or eliminate effects on fox.

WOLVERINES

Mitigation

Minimizing adverse effects on prey species and controlling access and harvest will help minimize the effect on wolverines.

BROWN BEARS

Mitigation

Controls on handling garbage, on harvest, and aircraft overflights; fencing; monitoring; and one-half mile buffer zones of no activity around dens (described under Alternative A) would mitigate adverse effects.

ARCTIC GROUND SQUIRRELS AND OTHER RODENTS

Mitigation

No additional mitigation is recommended.

MARINE MAMMALS

POLAR BEARS

Mitigation

No additional mitigation measures are recommended beyond those for Alternative A. Development of a marine facility at Pokok and its subsequent use would result in the loss of repeatedly used denning habitat.

SEALS AND WHALES

Mitigation

Recommended measures for full development would also apply to limited development. If marine facilities in the Pokok area were not developed, the adverse effects of disturbance, noise, lost food resources, and altered habitats would be further reduced.

BIRDS

SWANS, GEESE, AND DUCKS

Mitigation

Mitigation of impacts on swans, geese, and ducks would be the same as for Alternative A.

SEABIRDS AND SHOREBIRDS

Mitigation

Recommended measures would be the same as for Alternative A.

RAPTORS

Mitigation

Mitigation measures designed for full development would apply, including activity restrictions near nest sites.

PTARMIGAN

Mitigation

Recommendations under full leasing would apply.

PASSERINES

Mitigation

Measures would be as recommended under full leasing.

FISH

Mitigation

The same measures as those recommended for Alternative A would be appropriate for this alternative.

THREATENED AND ENDANGERED SPECIES

BOWHEAD AND GRAY WHALES

See discussion under Seals and Whales.

ARCTIC PEREGRINE FALCON

Mitigation

Measures would be the same as those recommended for Alternative A.

Effects on Human Environment

POPULATION

~ SOCIOCULTURAL SYSTEM ~

Mitigation

All the mitigation measures mentioned in Alternative A should be considered for this alternative.

EXISTING LAND USE

~ SUBSISTENCE USE ~

Mitigation

As for full leasing, mitigation applicable to species used for subsistence would also lessen effects on subsistence harvest. However, policies designed to reduce disturbance and other adverse effects on fish and wildlife species by restricting access and harvest in some areas would adversely affect subsistence use, mainly for residents for Kaktovik.

LAND STATUS AND MILITARY AND INDUSTRIAL USE

NATIVE ALLOTMENTS

STATE AND LOCAL POLITICAL AND ECONOMIC SYSTEMS

PUBLIC SERVICES AND FACILITIES

ARCHEOLOGY

Mitigation

Surveys in areas to be developed and avoidance of known or discovered archeological sites will minimize the potential for site destruction.

RECREATION, WILDERNESS, AND ESTHETICS

Mitigation

Limiting numbers of river and stream crossings and not siting development facilities within 5 miles of designated wilderness areas would reduce adverse visual effects within the 1002 area and in adjacent designated wilderness areas.

3. Please provide a detailed comparison of the mitigation measures proposed in the 1002 report and the stipulations included in the KIC lease.

ANSWER:

A side-by-side comparison is attached. You will note that the KIC/ASRC stipulations in the Chandler Lake Agreement apply only to oil and gas exploration and the extraction, processing, transportation and storage of sand and gravel.

Attachment to Question 3

1.	1002 Report:	Limit oil exploration, except surface geology studies, to November 1-May 1 (exact dates to be determined by Refuge Manager). Cease exploration activities and remove or store equipment at an approved site by May 15. Local exceptions may be made.
	ASRC/KIC:	No similar generic stipulations, but designated special areas are closed for specified periods to all exploration activities, and ground vehicles shall be operated only in the winter.
2.	1002 Report:	Consolidate, site, construct, and maintain facilities and pipelines to minimize effects on sensitive fish and wildlife habitats and species. Locate nonessential facilities outside concentrated caribou calving areas.
	ASRC/KIC:	The type and location of all structures and facilities, permanent and temporary, including but not limited to drill pads, camp pads, ice roads and ice airstrips, for use in support of exploration activities shall not significantly adversely affect the wildlife, its habitat, or the environment or ASRC Lands or of Refuge lands.
3.	1002 Report:	Design all bridges and culverts to handle at least 50-year flood events.
	ASRC/KIC:	No similar stipulation.
4.	1002 Report:	Use ice or gravel-foam-timber pads, where feasible.
	ASRC/KIC:	No similar stipulation.
5.	1002 Report:	Prohibit: gravel removal from active stream channels on major fish-bearing rivers; winter water removal from fish-bearing waters, or springs and tributaries feeding into fish-bearing waters; spring, summer, or fall water removal from fish-bearing waters to levels that will not easily pass fish or maintain quality rearing habitat.

ASRC/KIC: No water shall be removed from any stream, lake river or subsurface source except in accordance with a plan of operations. No water may be removed from any lake or stream identified by the Regional Director as necessary for the support of overwintering fish.

All operations shall be conducted in a manner that will not impede the passage of fish, disrupt fish spawning, overwintering or nursery areas identified by the Regional or block change the character or course of, or cause significant siltation or pollution of, any stream, river, pond, pothole, lake, lagoon, or drainage system.

Operation of equipment in unfrozen water areas of water bodies shall be prohibited during the winter, provided, that this shall not be construed as precluding appropriation of water from any water body in accordance with a plan of operation consistent with the environmental safeguards of these stipulations.

6. 1002 Report: Elevate pipelines to allow free passage of caribou or place ramps or bury as feasible.

ASRC/KIC: The operations shall be conducted in such a manner as not to impede or restrict the free passage and movement of large mammals, including caribou, muskoxen, moose, polar bear, and brown bear.

7. 1002 Report: Separate roads and pipelines 400-800 feet, depending on terrain, in areas used for caribou crossing.

ASRC/KIC: See #6, above.

8. 1002 Report: Construct docks and causeways so that fish movements are not impeded and lagoon water chemistry is basically unchanged.

ASRC/KIC: No similar stipulation because docks or causeways were not necessary for exploration only.

9. 1002 Report: Avoid construction in coastal areas near river systems with topographic relief or bluffs; otherwise, minimize construction activities along the coast through the denning period. Minimize activities along the coast during late October-early November when polar bears come ashore to den.

ASRC/KIC: No similar stipulation.

10. 1002 Report: Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and infrastructure essential to move inland beyond the restricted zone; drill pads and production facilities could be allowed within the zone 1.5 to 3 miles from the coast on a site-specific basis.

ASRC/KIC: No similar stipulation.

11. 1002 Report: Prohibit surface occupancy in the Sadlerochit Spring Special Area.

ASRC/KIC: Not a consideration.

12. 1002 Report: Minimize surface occupancy in immediate vicinity of areas identified as supporting *Thlaspi arcticum*. Include information on identification and need for avoidance of *Thlaspi arcticum* in all environmental orientation briefings.

ASRC/KIC: Not a consideration.

13. 1002 Report: Use bear-proof fencing around certain facilities; develop solid waste management plans; incinerate putrescible waste daily; prohibit wildlife feeding; institute employee education programs as appropriate.

ASRC/KIC: Campsite and trails shall be kept clean of waste. Feeding of wildlife is prohibited. This includes the leaving of garbage or edibles in a place which would attract wildlife. Garbage shall be kept in covered animal-proof containers while awaiting incineration.

14. 1002 Report: Inventory project areas for cultural resources, evaluate resources, and implement mitigation to avoid or minimize impact.

ASRC/KIC: Prior to implementing any plan of operations, the operator shall obtain from the Regional Director copies of pertinent cultural resource reconnaissance reports, maps and other available documents. Exploration activities shall be conducted in a manner to mitigate, minimize or avoid any adverse effects on known cultural resource sites and areas of predicted high probability of containing cultural resources. The following prohibitions shall be in effect:

(i) No land vehicle of any type shall pass over or through a known cultural resource site; and

(ii) No seismic train shall camp, nor shall a drill pad and associated facilities be located, on a known cultural resource site.

If any exploration activities require entry into areas known to contain historic or archeological resources, high probability areas, or areas previously unsurveyed for cultural resources, prior to the initiation of such activities, the operator shall so advise ASRC and, if ordered by ASRC in consultation with the Regional Director and the State Historic Preservation Officer, locate, identify and evaluate properties for eligibility to the National Register of Historic Places and take appropriate measures to avoid or mitigate adverse effects to eligible properties. Pads, wells, structures, or other facilities may be established within 250 yards of the seacoast, on banks and stabilized gravel bars of major streams, high eminences with a view or stabilized areas at the deltas of major rivers only after a field examination conducted under snow- and ice-free conditions. Such efforts shall be without expense or liability to the Department.

15. **1002 Report:** Prohibit off-road vehicle use within 5 miles of all pipelines, pads, roads, and other facilities, except by local resident engaged in traditional uses or if otherwise specifically permitted.

ASRC/KIC: No similar stipulation. However, numerous stipulations were developed concerning types of vehicles and methods of use:

Vehicles shall be operated in a manner such that the vegetative mat or soil is not significantly damaged or displaced. Blading of snow on trails or campsites shall be limited so as to maintain an adequate protective cover.

Ground vehicles shall be of the type causing the least practicable harm to the surface, such as track type vehicles, Rolligon type vehicles, mobile camps on flexible tracks or skids, vibrator units on flexible tracks or wheels, D-7 tractors, or their equivalent. They shall be operated only in the winter and where there is adequate protective cover.

16. 1002 Report: Establish time and area closures or restrictions on certain surface activity such as exploration, vehicle movements, and other activity that can be reasonably rescheduled, in areas of wildlife concentration during muskox calving, April 15-June 5; caribou calving, May 15-June 20; caribou insect harassment, June 20 Aug. 15; snow goose staging, Aug. 20-Sept. 27; and fish overwintering and spawning.

ASRC/KIC: Caribou Calving and Post-Calving:

The Regional Director is authorized to designate within ASRC Lands specific caribou calving and post-calving special areas that will be closed to all exploration activities for such periods from May 1 through August 31 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect caribou calving and post-calving activities including but not limited to relief from insects. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that caribou are not using the area.

Snow Goose Staging:

The Regional Director is authorized to designate within ASRC Lands specific snow goose staging special areas that will be closed to all exploration activities for such periods from August 20 through September 10 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect snow goose staging. The Regional Director may shorten the period closure of reduce the area closed if it is determined that snow geese are not using the area.

Waterfowl Nesting Habitat:

The Regional Director is authorized designate within ASRC Lands specific waterfowl nesting habitat special areas that will be closed to all exploration activities for such periods from May 25 through August 1 of each year as are designated by the Regional Director to ensure that exploration activities do not significantly adversely affect waterfowl nesting habitat. The Regional Director may shorten the period of closure or reduce the area closed if it is determined that waterfowl nesting is not occurring within the area.

17. 1002 Report: Limit use of development infrastructure, roads and airstrips to persons on official business.

ASRC/KIC: No similar stipulation.

18. 1002 Report: Reinject drilling muds, cuttings, and other wastes where geologically feasible. Remove hazardous wastes off refuge to an approved disposal site.

ASRC/KIC: All hazardous substances utilized or generated in conducting exploration activities shall be contained, controlled, and cleaned up in accordance with the operator's hazardous substances control and contingency plan, as reviewed by the Regional Director. Such measures shall take precedence over all other matters except human safety.

19. 1002 Report: Close areas within 3/4 mile of high-water mark of specified water courses to permanent facilities and limit transportation crossings. Gravel removal may occur on a site-specific basis.

ASRC/KIC: Except for stream crossings identified in the plan of operations, movement of equipment through riparian willow stands in, or adjacent to, streams is prohibited, except where no feasible and prudent alternatives exist and prior approval of the Regional Director has been given.

Campsites may be located on lakes which are frozen throughout, including bottom sediments, on durable ground, and on lagoons which are frozen to sufficient depth to ensure safety of personnel, but shall not be located on river ice. Durable ground can include gravel or sand bars or vegetated frozen ground with adequate protective cover.

The operator shall not significantly alter the banks of streams, rivers, or lakes while conducting exploration activities. Crossings of stream, river, or lake banks shall utilize a low angle approach or, if appropriate, snow bridges. If snow bridges are utilized for bank protection, they shall be free of dirt and debris and shall be removed after use or prior to breakup each year, whichever occurs first.

A minimum distance of 200 feet shall be maintained between the toe of the gravel pads used for housing, or for storage of materials other than vehicles, hydrocarbons or toxic compounds, and any adjacent lake or stream bank;

Drill pads, roads and other facilities must be sited outside of productive Class IV, VI and VIII wetlands (as defined in Bergman, et al, Water Birds and Their Wetlands Resources in Relation to Oil Development at Storkerson Point, Alaska, USFWS Resource Publication 129, 1977) when feasible. If facilities are sited within or in close proximity to productive Class IV, VI and VIII wetlands, such facilities must be sited, designed, constructed and operated so as to maintain natural hydrological patterns and to prevent oil contamination.

20. 1002 Report: Prohibit use of explosives or other noisy activities within 2 miles of raptor nest sites April 15-August 31 (June 1 if nest is unoccupied), unless specifically authorized by the FWS.

ASRC/KIC: No similar stipulation; no raptor nesting in the ASRC/KIC area.

21. 1002 Report: Prohibit ground-level activity, permanent facilities, and long-term habitat alterations (material sites, roads, and airstrips) within 1 mile of know peregrine or other raptor nest sites april 15-August 31 (June 1 if nest is unoccupied) unless specifically authorized.

ASRC/KIC: No similar stipulation; no raptor nesting.

22. 1002 Report: Survey suitable habitat annually to locate nesting peregrines and other raptors.

ASRC/KIC: No similar stipulations; no raptor nesting.

23. 1002 Report: Establish no-activity zone of at least 1/2 mile around any confirmed polar bear den.

ASRC/KIC: No explosives shall be detonated within 1/2 mile of any known denning brown or polar bear or any muskoxen or caribou herd.

24. 1002 Report: Close area within 5 miles of development and associated infrastructure to hunting, trapping, and discharge of firearms, except for subsistence uses only, on a site-specific basis, where there will be major effects on those uses.

ASRC/KIC: Hunting, fishing, and trapping by the operator and its employees on ASRC Lands and Refuge lands are prohibited during the conduct of exploration activities except this prohibition shall not apply to local residents engaged in subsistence uses. As a condition of employment, the operator shall advise employees of the foregoing prohibition. Use of firearms in defense of life and property is allowed.

25. 1002 Report: Develop and implement plans for control, use, and disposal of fuel and hazardous wastes.

ASRC/KIC: All spills or leakages of any hazardous substance, fires and any other conditions which threaten the resources or the environment of ARC Lands or Refuge lands shall be reported by the operator to ARC Lands and the Regional Director. Other notifications shall be made by the operator as required by applicable laws.

All combustible solid waste shall be incinerated or returned to the operator's base of operations for disposal in accordance with applicable Federal, State and local standards. All non-combustible solid waste, including, but not limited to, fuel drums and shot wire, shall be returned to the operator's base of operations for disposal in accordance with applicable Federal, State and local standards.

No discharge of petroleum, petroleum products, or toxic materials shall be made on ARC Lands or Refuge lands. Changing oil in, and refueling of, vehicles shall be performed in such locations and by such methods, and maintenance personnel shall appropriately trained, to prevent such discharges.

No fuel storage facilities shall be placed within the annual floodplain of fish-bearing watercourses or within 100 feet of any other water body, and no vehicle refueling shall occur within such areas. Fuel containers shall be properly stored and marked with the operator's name, type of fuel, and last date of filling. All fuel containers with a storage capacity greater than 55 gallons shall be of double-wall or equivalent construction. All fuel containers, including those emptied, shall be capped when not in actual use. All fuel containers placed within the annual floodplain of fish-bearing watercourses shall be removed prior to breakup.

Fuel pits shall be designed to hold 110 percent of the maximum anticipated volume of stored fuel and shall be lined with an impermeable membrane;

Fuel lines shall not be buried unless all joints are exposed for daily inspection;

26. 1002 Report: Monitor populations, productivity, movements, and general health of key species. Research measures to further minimize adverse effects of development implement corrective actions.

ASRC/KIC: No similar stipulation.

27. 1002 Report: Provide environmental orientation briefings for workers; program for monitoring development activities; continuation of fish and wildlife population; follow-up programs to evaluate effects.

ASRC/KIC: The Regional Director shall have such reasonable access to the area of operations as is necessary to properly monitor and ensure compliance with the plan of operations.

28. 1002 Report: Develop plans in conjunction with area residents and organizations to properly manage impacts on communities.

ASRC/KIC: No similar stipulation, but when a plan of operations is submitted to the Regional Director, copies of all necessary permit applications will simultaneously be submitted to the State for coordination of review and comment by the State and other public entitites within the State.

29. 1002 Report: Develop and implement an approved rehabilitation plan as part of the appropriate permit stages.

ASRC/KIC: Upon the completion of exploration activities, the operator shall submit a reclamation plan for approval of the Regional Director, acting in consultation with ASRC, and shall implement the plan according to its terms.

> Reclamation of disturbed surface areas shall be accomplished by the operator, in accordance with schedules and a plan approved by the Regional Director in consultation with ASRC.

The ASRC/KIC Agreement contained additional, more specific stipulations which are not comparable to the summary of 29 mitigation measures in the report. However, on page 110 of the report, Assumption 5 assumes these ASRC/KIC stipulations, plus the stipulations for the seismic exploration program, to be in effect for oil and gas activities in the 1002 area, should Congress open the coastal plain to leasing. For convenience, the remaining ASRC/KIC stipulations not included in the above comparison follow:

ASRC/KIC Stipulations:

Exploration activities will be supported only by ice roads, winter trails, existing road systems and air service.

Above ground explosive charges shall be utilized in a manner to minimize damage to the vegetative mat.

To protect fish and other aquatic fauna, high explosives shall not be detonated within, beneath, on or in close proximity to fish-bearing waters unless prior drilling indicates that the water body, including its substrate, is solidly frozen. The minimum acceptable offset from fish-bearing waters for various size charges is:

1 pound charge --	50 feet
2 pound charge --	75 feet
5 pound charge --	125 feet
10 pound charge --	150 feet
25 pound charge --	250 feet
100 pound charge --	500 feet

No charge in excess of 100 pounds shall be detonated unless approved by ASRC after consultation with the Regional Director.

Wildlife shall not be harassed in any manner, including, but not limited to, close approach by surface vehicles or aircraft. Aircraft should maintain an altitude of 1,500 feet above ground level whenever practicable.

Gray water may be discharged to the surface provided it is filtered, disinfected, and not discharged directly into lakes and rivers.

All precautionary measures shall be taken to prevent and suppress man-caused tundra fires.

The operator shall not disturb or damage any geodetic or cadastral land survey monuments. If any monument is disturbed or damaged, the operator shall re-establish it in a manner acceptable to the Secretary or other competent authority.

A minimum distance of 300 feet, except 600 feet from anadromous fish streams, shall be maintained between the toe of the gravel pads used for drilling, pits, and storage of vehicles, fuels and hydrocarbons or other toxic compounds and any adjacent lake or stream bank.

If natural surface drainage is disrupted by any non-natural surface disturbance, drainage structures shall be installed and maintained that are adequate to maintain natural surface drainage and fish passage, and culverts shall be maintained in good repair, replaced or upgraded during the same thaw season in which inadequate drainage occurs.

Reserve pits shall be designed to hold 150 percent of design discharge and anticipated snow melt or the well head shall be equipped with an annulus to allow for subsurface discharge of drilling fluids in an environmentally acceptable manner.

Reserve pits shall be rendered impermeable by a design of the operator's choice, other than reliance upon permafrost.

All hydrocarbons discharged into flare and relief pits shall be removed and properly disposed of as soon as practicable during the winter but prior to spring breakup, except that during periods of thaw such removal shall occur within 72 hours of discovery.

Snow removed from pads shall not be pushed more than 100 feet from the toe of the pad.

When natural spits and islands are used as drilling structures, vehicle engines and gear housing shall be equipped with sorbent diapers, and drilling cuttings shall be bagged and shall not be discharged in the adjacent natural waters or used as a berm to protect drilling structures.

When an exploratory well bottom hole depth will not exceed 10,000 feet true-vertical depth, the well shall be drilled from an ice pad with piling support for the drill rig.

The extraction, processing, transportation and storage of sand and gravel on ASRC Lands shall be conducted so as not to significantly adversely affect the wildlife, its habitat, or the environment of ASRC Lands or of Refuge lands, shall be conducted in accordance with the provisions of Paragraph B.3(c)-(m) of these stipulations, and shall be subject to the following special stipulations for environmental protection of ASRC Lands and Refuge lands:

Sand and gravel extraction, processing or storage sites shall be located in a minimum distance of 300 feet from all water bodies containing anadromous fish, arctic grayling or white fish.

Sand and gravel extraction, processing or storage sites and overburden removed from such sites shall not interrupt natural drainages.

Sand and gravel extraction, processing or storage sites shall not be located within the active floodplains of water courses as defined in the Gravel Removal Guidelines Manual for Arctic and SubArctic Floodplains (USFWS 1980), unless there are no feasible and prudent alternatives. In the event that there is no feasible and prudent alternative to sand and gravel extraction, processing or storage within the active floodplain of water courses, and in the event that such sand and gravel extraction, processing or storage in active floodplains shall be undertaken in accordance with the provisions of the above-referenced Guidelines, to the extent practicable.

Sand and gravel and associated overburden shall not be extracted from, processed in or stored on productive coastal wetlands Class VIII (as defined in Bergman, et al, Water birds and Their Wetland Resources in Relation to Oil Development at Storkerson Point, Alaska, USFWS Resource Publication 129, 1977).

In addition, we point out that Appendix 2 of the agreement includes stipulation D which governs the exploration and development of resources other than sand and gravel and oil and gas.

All of the stipulations described above are in Appendix 2 of the Agreement. Appendix 1 has certain affirmative covenants that also relate to environmental issues and community impacts such as floodplain development, wetlands, subsistence and monitoring.

Finally, we point out that stipulation B.9 provides that, except for certain procedural agreements, these stipulations will be superseded by the regulations promulgated pursuant to an opening legislation.

4. In the absence of a new provision in the ANWR legislation, what statute would govern liability for oil spills during exploration, development or production? Does the Department believe the statutory requirements provide adequate protection in the case of an oil spill or would you suggest that additional statutory requirements be imposed?

ANSWER:

We feel that the authorities and site specific stipulations to a permit to build pipelines discussed below are adequate and the most appropriate way to ensure adequate protection against an oil spill.

In the absence of a new provision in the ANWR legislation, the following agencies, regulations and statutes would be applicable. EPA has the lead in oil spill responsibility under its regulations in 40 CFR part 112 implementing the Clean Water Act for inland oil spills which may reach navigable waters. These regulations specify clean up and require oil spill control and counter measure plans (OSCCMP) where 10,000 bbls. storage is involved. The State of Alaska's Department of Environmental Conservation believes that it has concurrent responsibility under its regulations 18 AAC 75 (title 40) implementing the Clean Water Act for oil spills on any land in the state. Again the clean up plan (OSCCMP) is required for storage above 10,000 bbls. Similarly, the Department of Transportation under its regulations in 49 CFR has responsibility for petroleum pipeline safety. Additionally, the Fish and Wildlife Service has the responsibility as the surface managing agency to ensure that pipeline rights-of-way are environmentally acceptable and in keeping with the refuge purposes as outlined in 50 CFR 29.21-9, the rules that govern the use of a refuge for pipelines for transportation of oil. Generic statutory leasing authority along with the above mentioned statutes and regulations are sufficient to provide adequate protection in case of an oil spill. The Department of the Interior is generally responsible on federal leases for field operating safety and surface protection. The specifics are laid out in 43 CFR 3100's.

5. You suggested that the Department be given new statutory authority for leasing pipeline rights-of-way across the 1002 area.

a. Would the provisions of FLPMA (43 U.S.C. 1761, 1736) pertaining to rights-of-way and utility corridors govern in the absence of new statutory provisions?

b. What amendments to those provisions, or other statutory authority, would you suggest be included?

ANSWER:

a. No. Title XI of the Alaska Lands Act would be the applicable provision.

b. We recommend the following language to address this issue:

Notwithstanding Title XI of the Alaska National Interest Lands Conservation Act (16 U.S.C. 3161 et seq.), or other Federal law, this section shall contain the sole and exclulsive authority for the Secreary to grant rights-of-way and easements across the coastal plain for oil and gas activities under such terms and conditions as may be necessary to avoid any unnecessary adverse effect on the coastal plain's fish and wildife, habitat, and other natural resources, including requirements that facilities be sited or modified so as to avoid unnecessary duplication of facilities. Failure to comply with any such term or condition, or any other regulation prescribed under this Act, shall be grounds for the issuance of a penalty under section 8 of this Act or forfeiture of the grant in an appropriate judicial proceeding insitituted by the United States in any United States district court having jurisdiction under the provisions of this Act.

6. What type of provision does the Department support, as a limitation on judicial review of the Final LEIS as the programmatic EIS for the leasing program? Please provide specific statutory language.

ANSWER:

We recommend the following language concerning use of the Final LEIS as the programmatic EIS for the leasing program:

> The detailed environmental studies and assessment conducted by the Secretary under section 1002 of the Alaska National Interest Lands Conservation Act shall be deemed to have fulfilled the requirements of section 102(2)(C) of the National Environmental lPolicy Act (42 U.S.C. 4332(2)(C)) with regard to the establishment of a leasing program under this Act., and the initial promulgation of of the implementing regulations therefor.

Please see the answer to the next question for our recommendation concerning judicial review provisions.

7. Does the Department support any other provisions limiting judicial review of the Secretary's decisions in subsequent steps of the ANWR process -- leasing, exploration, and production.

ANSWER:

The Department would support provisions limiting judicial review of the Secretary's decisions. Provisions limiting judicial review are contained in section 203 of the Trans-Alaska Pipeline Authorization Act (copy attached). This section should be examined for its relevancy to ANWR.

8. Please provide the statutory language for amendments to S. 1217 covered in your testimony, and any other amendments the Department supports.

ANSWER:

Language to implement our recommendations is being developed. We will provide it as soon as the appropriate Departmental and Administration review has been completed.

9. Your statement says,

> "... we propose to comply with NEPA for each subsequent step of the process -- leasing, exploration, and production."

a. Based upon your understanding of the NEPA requirements, what does that mean?

b. At which specific stages in the process would you intend to prepare an environmental assessment?

c. At which specific stages in the process would you intend to prepare a full-fledged EIS?

d. Would the EIS process require you to consider the option of not issuing leases for a specific area?

e. When would public hearings be held?

f. How long would the process take at each stage?

g. At which specific stages in the process would the Secretary's decision to proceed, or not to proceed, be subject to judicial review?

h. Please provide the Committee with a copy of the relevant administrative guidelines governing the NEPA process.

ANSWERS:

a. It means that insofar as the Department of the Interior has lead responsibility for implementing any of the myriad phases of a leasing program, it will integrate the NEPA process with other planning to ensure that decisions reflect environmental values. It further means that through environmental assessments (EA) and impact statements (EIS) the Department will identify and assess the reasonable alternatives of proposed oil and gas activities that will avoid unnecessary adverse effects of these activities on the coastal plain resources. As part of the process, the Department would coordinate with those Federal and State agencies with jurisdiction by law or special expertise, such as the Environmental Protection Agency and Alaska Department of Environmental Conservation.

b. and c. In accordance with CEQ regulations and Departmental guidelines, EA's are prepared for all actions, except those covered by categorical exclusion (often budgetary and administrative actions), covered sufficiently by an earlier environmental document, or for those actions for which a decision has already been made to prepare an EIS. The purpose of an EA is to allow the responsible official to determine whether a finding of no significant impact (FONSI) is appropriate, or to prepare an EIS. An EA may be prepared on any action at any time in order to assist in planning and decisionmaking. Public notification of the availability of an EA must be provided, and where appropriate, the public may be involved in the EA process. Much like an EIS, an EA contains a brief discussion of the need for the proposal, alternatives, impact of the proposed action and alternatives, and a list of agencies and persons consulted. The level of detail and depth of analysis is limited to that needed to determine whether there are significant environmental effects.

An EIS is prepared if the analysis in an EA results in a finding of significant impact, or in the absence of an EA, when the proposed activity is of the scope and significance normally requiring an EIS. The point at which an EIS should be prepared is the stage prior to the first point of major commitment to a proposal, for example, location of a transportation corridor. Preparation of an EIS need not commence until an application is complete, all required environmental information has been submitted, or any consultation required with other agencies has been conducted.

It would be premature to suggest at this time at what stage of a leasing program an EA or an EIS might be prepared. It could be presumed that EA's could cover many, if not all, of the smaller, more routine field activities. However, since the area is mostly a wetland, many actions would require a section 404 permit from the Corps of Engineers, and NEPA compliance would be their responsibility; our role would be consultative. Based on activities at Prudhoe Bay, EIS's would probably be necessary before major construction such as ports or causeways could occur.

d. The Council on Environmental Quality (CEQ) regulations to implement NEPA require consideration of a "No Action" alternative, which would be "no leasing."

e. Public hearings and public meetings would be used as appropriate before EIS's were prepared as part of the scoping process, and as necessary between draft and final stages of EIS's.

f. The length of the process of preparing EA's and EIS's varies greatly depending on many factors such as the amount of data and analysis available or the degree of controversy surrounding the proposed action, and, of course, there are minimum time standards set by CEQ for public review. No exact schedule or timeframe can be reliably provided. In the case of the LEIS which is part of the report to Congress, it took approximately 2 1/2 years. This is not including the biological baseline studies and the seismic exploration program, but just the actual complication and analyses of data and preparation of the document. Experience on the North Slope has indicated that it generally takes about 3 years to complete the EIS process for oil and gas activities.

g. Once a final EIS is made available to the public, there is a 30-day waiting period establish by CEQ's regulations before a decisionmaker may sign the Record of Decision. Litigation frequently occurs at this stage of the process since the preferred alternative is clearly identified at this point in time. However, as has been demonstrated on the LEIS for the report and in numerous other court cases, litigation can occur at any point in the process.

h. Attached is a copy of the Department's NEPA guidelines.

10. Please provide the Committee with a detailed explanation of the "404" permit and consultation process.

    a. What is the statutory basis for the process?

    b. What administrative requirements govern the process?

    c. Are State and local officials included in the process? What sort of veto, concurrence, or other decision-making authority do they have during the process?

ANSWER:

Anyone planning a project that involves the deposition of dredged or fill material into waters of the United States is required to obtain a permit authorizing the discharge from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act (Act). The Corps' authority to issue such permits is found in Section 404(a) of the Act. To start the permit review process the person must submit an application which includes: 1) a complete description of the proposed activity and activities which are related to the project; 2) a description of any material to be dredged; 3) the source of any fill material; 4) a description of the use of any proposed structure; 5) demonstration of meeting dam safety requirements where applicable; 6) a signature; and 7) a $10.00 fee for individuals or $100 fee for commercial projects.

Once application is made, the Corps determines whether the proposal can be authorized by a nationwide permit, a regional permit or an individual permit. Nationwide and regional permits are issued for projects that are similar in nature and minor in impact, both individually and cumulatively. The author to issue such general permits is found in section 404(e) of the Act. The permit applicant can receive authorization under general permits in a matter of days, with little or no public notice given. It is estimated 10,000 projects are authorized by individual permit 10,000 by regional permit and 80,000 by nationwide permit per year.

If the Corps decides that the project does not qualify for a general permit, an individual permit will be required. The procedures and timeframes for evaluating individual permit applications are found at 33 CFR Parts 320 through 330 (Regulatory Programs of the Corps of Engineers). Once a completed application is received by the Corps, it is required to issue a public notice within 15 days. This public notice is circulated to a variety of Federal, State, and local agencies, civic organizations and posted in public places such as local post offices.

Under provisions of the Fish and Wildlife Coordination Act the Corps must specifically consult with the Fish and Wildlife Service (Service) and the State fish and game agency for review. The purpose of this is to provide the Corps with information pertaining to the possible damage to fish and wildlife resources and to determine means and measures that should be adopted to prevent the loss of or damage to such resources. Receipt of the public notice by the Service also initiates the Endangered Species Act section 7 consultation process. The comment period is generally 30 days (except as noted later within discussion). Once the comment period is closed the Corps reviews the comments of all parties; conducts its NEPA review; determines whether or not the project complies with the requirements established by the Environmental Protection Agency (EPA) pursuant to section 404(b)(1) and found in 40 CFR Part 230; and determines whether the project is in the public interest. The administrative and regulatory procedures for these reviews has been consolidated and is found in 33 CFR Parts 320 through 330.

Section 401 of the Act requires the applicant, if the activity may result in a discharge of a pollutant into waters of the United States, to obtain a certification from the States in which the discharge would originate. The State must certify that the discharge will comply with the applicable effluent limitations and water quality standards. Almost all discharges of dredged or fill material are covered by section 401. No permit will be granted by the Corps until the required certification has been obtained or has been waived. Denial of such State certification results in denial by the Corps.

When all applicable determinations have been made and requirements met the applicant can receive the permit. The District Engineer of the local Corps office must make a decision not later than 60 days after receipt of a complete application, unless precluded as a matter of law or procedures required by law, such as NEPA or the Endangered Species Act. Preparation of an EIS could take several months to over a year and the Endangered Species section 7 consultation process may take a maximum of 90 days under most circumstanmces. A vast majority of cases, however, are handled within the 60-day timeframe.

The EPA is the only Federal Agency with veto authority over a Corps permit. This authority is found in section 404(c) of the Act, and the procedures are found in 40 CFR Part 231. The EPA may exercise its veto authority if determines that issuance of the permit would have an unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife or recreation areas.

The Service has no veto authority and is strictly an advisory agency. The Service, however, can appeal the District Engineer's decision through each echelon of the Corps to the Assistant Secretary of Army/Civil Works. This procedure and timeframes are established in a Memorandum of Agreement (Memorandum) that was developed pursuant to section 404(q) of the Act. The most recent Memorandum was signed in November 1985. The Memorandum is designed to allow for issue resolution at the field levels and in a timely manner. Since the Memorandum was signed, the Corps has authorized approximately 200,000 projects, 20,000 of them by individual permit. Only 5 have been appealed to the Assistant Secretary of the Army. The entire process of appeal to the Assistant Secretary level generally takes 90 days to complete, from the time of the District Engineer's decision. In no case should the process exceed 120 days. Intermediate deadlines are of course established for each step in the process. The Assistant Secretary of Army can support the District Engineers position, evaluate the issue at his level, or remand the issue to any level within the Corps for final disposition, which could include final permit issuance or denial.

Additional Questions for Department of the Interior witness Submitted by Senator Johnston

1. What diligent development requirements do you think should apply to leases on the Coastal Plain?

ANSWER:

Some diligence requirements may serve the function of ensuring leases are held by those lesses most interested in exploration. That is, it may be useful to force forfeiture of a lease to allow government to offer such a prospect to more interested companies. Nevertheless, the economic question of when resources should be expended on exploration, development, and production activities is best left to private market decisions, and not government. Market forces are the best mechanism for determining when resources are most valuable to society.

Diligence requirements for exploration are therefore recommended in the form of a reasonable lease term. We believe that a 10-year primary lease term, with provisions that include the authority to suspend if an adequate transportation system is not in effect, is appropriate, given the conditions on the North Slope. If the lessee does not explore a lease within that set time period, that lease should be forfeited. No other special diligent development requirements should be necessary.

2. Do you believe unitization of leases should be required of the Coastal Plain?

   - o If so, please describe the unitization requirements you would impose and the circumstances under which they would be applicable.

ANSWER:

We do not believe unitization of leases should be mandatory. We do believe the authority to unitize would be useful in a few circumstances. These include:

- voluntary unitization by the lessees;
- in the interest of conservation of resources, prevention of waste;
- to protect correlative rights in the event a lessee cannot drill or produce from the lease.
- to avoid unnecessary duplication of support facilities;
- to avoid unnecessary adverse effects on the fish and wildlife, their habitats or the environment.

3. Do you think that any ANWR leasing legislation should provide the Secretary with lease cancellation authority?

If so, please describe the terms and conditions for cancellation that you think would be appropriate.

ANSWER:

The Secretary should have the authority to cancel leases when he deems it necessary. The cancellation of a lease should probably occur under the following circumstances:

a. The leases could not comply with conditions for ending a suspension for temporary prohibition of production or other activity on a lease.

b. Continued activity on the lease would probably cause serious harm or damage to wildlife, property, other mineral deposits, national security or defense, or to coastal or human environment.

c. The threat of harm of damage would not disappear or decrease to an acceptable extent within a reasonable period of time.

d. The advantages of cancellation outweight the advantages of continuing the lease in force.

e. The lease failed to comply with any of the provisions of the law, regulations issued, or the lease.

f. It was proven that the lease was obtained by fraud or misrepresentation.

Such cancellation/compensation provisions are provided in section 5 of the OCS Lands Act, as amended, but we do not advocate compensation in those situations where the lessee is negligent or commits a knowing violation.

4. Your testimony recommends that the Secretary have authority to require that there be no unnecessary duplication of facilities on the Coastal Plain. What specific provisions would you recommend?

ANSWER:

In addition to having only a single main pipeline (similar to the Trans-Alaska Pipeline System), we would recommend that all roads, causeways and all port facilities be shared by developers where possible. Of course much of this will occur naturally as an economic advantage in a costly Arctic environment, as has occurred at Prudhoe Bay. We would probably not recommend a major airport facility since the commercial facility at Deadhorse should be adequate to handle air travel. However, we would probably recommend shared use of cargo airport facilities to keep the construction of large runways to a minimum. These are just a few examples of possible ways to minimize duplication of facilities.

5. Do you have recommendations for minimizing the impacts of production support facilities, including facilities of service companies, such as those presently located in Deadhorse?

ANSWER:

Limiting the impact of any production-related facilities, including support facilities, would be largely addressed through the use of mitigation standards and other necessary environmental controls on land use. In addition, to further minimize such impacts, the Secretary is requesting the authority to require consolidation of facilities to prevent unnecessary duplication. The combination of these measures whould result in an environmentally sound development program which minimizes the footprint of oil and gas activities on the North Slope.

6. Do you have recommendations for minimizing the impacts and duplication of transportation facilities.

ANSWER:

Please see response to question 4.

7. What environmental criteria are applied in determining which areas of the OCS will be made available for leasing and the order in which these areas will be made available?

- **Does the Department have any specific procedures or guidance with respect to application of these criteria? If so, please provide copies to the Committee.**

ANSWER:

The environmental criteria for determining the timing and location of areas to be made available for leasing on the OCS are contained in section 18 and 20 of the Outer Continental Shelf Lands Act, as amended (OCSLA), as attached. Preparation of the leasing program is also discussed in 30 CFR Part 256. However, these regulations do not address the use of environmental information in determining the timing and location of lease sales.

Section 18(a)(3) of the OCSLA requires the Secretary to balance the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impacts on the coastal zone in determining the timing and location of leasing activities.

Section 18 of the OSCLA also establishes a set of environmental criteria to be used in the development of the schedule of proposed lease sales. These criteria include the following:

- Existing information concerning the geographical, geological, and ecological characteristics of the proposed lease areas [section 18 (a)(2)(a)];
- equitable sharing of developmental benefits and environmental risks among the proposed lease areas [section 18(a)(2)(B)];
- relative marine productivity and environmental sensitivity of the proposed lease areas [section 18(a)(2)(G)]; and
- relevant environmental and predictive information for the proposed lease areas [section 18(a)(2)(H)].

Section 20 of the OSCLA establishes the criteria for the Secretary to develop environmental information relevant to leasing decisions on all areas proposed for leasing. Environmental studies are also discussed in 30 CFR Part 256. However, these regulations do not address the use of environmental studies information in the preparation of the leasing program.

ATTACHMENT TO
QUESTION 7

(e) Source materials essential to production of fissionable materials

All uranium, thorium, and all other materials determined pursuant to paragraph (1) of subsection (b) of section 5 of the Atomic Energy Act of 1946, as amended, to be peculiarly essential to the production of fissionable material, contained, in whatever concentration, in deposits in the subsoil or seabed of the outer Continental Shelf are reserved for the use of the United States.

(f) Helium ownership; rules and regulations governing extraction

The United States reserves and retains the ownership of and the right to extract all helium, under such rules and regulations as shall be prescribed by the Secretary, contained in gas produced from any portion of the outer Continental Shelf which may be subject to any lease maintained or granted pursuant to this subchapter, but the helium shall be extracted from such gas so as to cause no substantial delay in the delivery of gas produced to the purchaser of such gas.

(Aug. 7, 1953, ch. 345, sec. 12, 67 Stat. 469.)

§1342. Prior claims as unaffected

Nothing herein contained shall affect such rights, if any, as may have been acquired under any law of the United States by any person in lands subject to this subchapter and such rights, if any, shall be governed by the law in effect at the time they may have been acquired:
Provided, however,

That nothing herein contained is intended or shall be construed as a finding, interpretation, or construction by the Congress that the law under which such rights may be claimed in fact applies to the lands subject to this subchapter or authorizes or compels the granting of such rights in such lands, and that the determination of the applicability or effect of such law shall be unaffected by anything herein contained.

(Aug. 7, 1953, ch. 345, sec. 14, 67 Stat. 470.)

§1343. Annual report by Secretary to Congress

Within six months after the end of each fiscal year, the Secretary shall submit to the President of the Senate and the Speaker of the House of Representatives the following reports:

(1) A report on the leasing and production program in the outer Continental Shelf during such fiscal year, which shall include—

(A) a detailed accounting of all moneys received and expended;

(B) a detailed accounting of all exploration, exploratory drilling, leasing, development, and production activities;

(C) a summary of management, supervision, and enforcement activities;

(D) a list of all shut-in and flaring wells; and

(E) recommendations to the Congress (i) for improvements in management, safety, and amount of production from leasing and operations in the outer Continental Shelf, and (ii) for resolution of jurisdictional conflicts or ambiguities.

(2) A report prepared after consultation with the Attorney General, with recommendations for promoting competition in the leasing of outer Continental Shelf lands, which shall include any recommendations or findings by the Attorney General and any plans for implementing recommended administrative changes and drafts of any proposed legislation, and which shall contain—

(A) an evaluation of the competitive bidding systems permitted under the provisions of section 1337 of this title, and, if applicable, the reasons why a particular bidding system has not been utilized;

(B) an evaluation of alternative bidding systems not permitted under section 1337 of this title, and why such system or systems should or should not be utilized;

(C) an evaluation of the effectiveness of restrictions on joint bidding in promoting competition and, if applicable, any suggested administrative or legislative action on joint bidding;

(D) an evaluation of present measures and a description of any additional measures to encourage entry of new competitors; and

(E) an evaluation of present measures and a description of additional measures dealing with supplies of oil and gas to independent refiners and distributors.

(Aug. 7, 1953, ch. 345, sec. 15, 67 Stat. 470; Sept. 18, 1978, Pub. L. 95-372, title II, sec. 207, 92 Stat. 648.)

Section 18

§1344. Outer Continental Shelf leasing program

(a) Schedule of proposed oil and gas lease sales

The Secretary, pursuant to procedures set forth in subsections (c) and (d) of this section, shall prepare and periodically revise, and maintain an oil and gas leasing program to implement the policies of this subchapter. The leasing program shall consist of a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity which he determines will best meet national energy needs for the five-year period following its approval or reapproval. Such leasing program shall be prepared and maintained in a manner consistent with the following principles:

(1) Management of the outer Continental Shelf shall be conducted in a manner which considers economic, social, and environmental values of the renewable and nonrenewable resources contained in the outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the outer Continental Shelf and the marine, coastal, and human environments.

(2) Timing and location of exploration, development, and production of oil and gas among the oil- and gas-bearing physiographic regions of the outer Continental Shelf shall be based on a consideration of—

(A) existing information concerning the geographical, geological, and ecological characteristics of such regions;

(B) an equitable sharing of developmental benefits and environmental risks among the various regions;

(C) the location of such regions with respect to, and the relative needs of, regional and national energy markets;

(D) the location of such regions with respect to other uses of the sea and seabed, including fisheries, navigation, existing or proposed sealanes, potential sites of deepwater ports, and other anticipated uses of the resources and space of the outer Continental Shelf;

(E) the interest of potential oil and gas producers in the development of oil and gas resources as indicated by exploration or nomination;

(F) laws, goals, and policies of affected States which have been specifically identified by the Governors of such States as relevant matters for the Secretary's consideration;

(G) the relative environmental sensitivity and marine productivity of different areas of the outer Continental Shelf; and

(H) relevant environmental and predictive information for different areas of the outer Continental Shelf.

(3) The Secretary shall select the timing and location of leasing, to the maximum extent practicable, so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone.

(4) Leasing activities shall be conducted to assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government.

(b) Estimates of appropriations and staff required for management of leasing program

The leasing program shall include estimates of the appropriations and staff required to—

(1) obtain resource information and any other information needed to prepare the leasing program required by this section;

(2) analyze and interpret the exploratory data and any other information which may be compiled under the authority of this subchapter;

(3) conduct environmental studies and prepare any environmental impact statement required in accordance with this subchapter and with section 4332(2)(C) of title 42; and

(4) supervise operations conducted pursuant to each lease in the manner necessary to assure due diligence in the exploration and development of the lease area and compliance with the requirements of applicable law and regulations, and with the terms of the lease.

(c) Suggestions from Federal agencies and affected State and local governments; submission of proposed program to Governors of affected States and Congress; publication in Federal Register

(1) During the preparation of any proposed leasing program under this section, the Secretary shall invite and consider suggestions for such program from any interested Federal agency, including the Attorney General, in consultation with the Federal Trade Commission, and from the Governor of any State which may become an affected State under such proposed program. The Secretary may also invite or consider any suggestions from the

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executive of any affected local government in such an affected State, which have been previously submitted to the Governor of such State, and from any other person.

(2) After such preparation and at least sixty days prior to publication of a proposed leasing program in the Federal Register pursuant to paragraph (3) of this subsection, the Secretary shall submit a copy of such proposed program to the Governor of each affected State for review and comment. The Governor may solicit comments from those executives of local governments in his State which he, in his discretion, determines will be affected by the proposed program. If any comment by such Governor is received by the Secretary at least fifteen days prior to submission to the Congress pursuant to such paragraph (3) and includes a request for any modification of such proposed program, the Secretary shall reply in writing, granting or denying such request in whole or in part, or granting such request in such modified form as the Secretary considers appropriate, and stating his reasons therefor. All such correspondence between the Secretary and the Governor of any affected State, together with any additional information and data relating thereto, shall accompany such proposed program when it is submitted to the Congress.

(3) Within nine months after September 18, 1978, the Secretary shall submit a proposed leasing program to the Congress, the Attorney General, and the Governors of affected States, and shall publish such proposed program in the Federal Register. Each Governor shall, upon request, submit a copy of the proposed leasing program to the executive of any local government affected by the proposed program.

(d) Comments by Attorney General on anticipated effect on competition; comments by State or local governments; submission of program to President and Congress; issuance of leases in accordance with program

(1) Within ninety days after the date of publication of a proposed leasing program, the Attorney General may, after consultation with the Federal Trade Commission, submit comments on the anticipated effects of such proposed program upon competition. Any State, local government, or other person may submit comments and recommendations as to any aspect of such proposed program.

(2) At least sixty days prior to approving a proposed leasing program, the Secretary shall submit it to the President and the Congress, together with any comments received. Such submission shall indicate why any specific recommendation of the Attorney General or a State or local government was not accepted.

(3) After the leasing program has been approved by the Secretary, or after eighteen months following September 18, 1978, whichever first occurs, no lease shall be issued unless it is for an area included in the approved leasing program and unless it contains provisions consistent with the approved leasing program, except that leasing shall be permitted to continue until such program is approved and for so long thereafter as such program is under judicial or administrative review pursuant to the provisions of this subchapter.

(e) Review, revision, and reapproval of program

The Secretary shall review the leasing program approved under this section at least once each year. He may revise and reapprove such program, at any time, and such revision and reapproval, except in the case of a revision which is not significant, shall be in the same manner as originally developed.

(f) Procedural regulations for management of program

The Secretary shall, by regulation, establish procedures for—

(1) receipt and consideration of nominations for any area to be offered for lease or to be excluded from leasing;

(2) public notice of and participation in development of the leasing program;

(3) review by State and local governments which may be impacted by the proposed leasing;

(4) periodic consultation with State and local governments, oil and gas lessees and permittees, and representatives of other individuals or organizations engaged in activity in or on the outer Continental Shelf, including those involved in fish and shellfish recovery, and recreational activities; and

(5) consideration of the coastal zone management program being developed or administered by an affected coastal State pursuant to section 1454 or section 1455 of title 16.

Such procedures shall be applicable to any significant revision or reapproval of the leasing program.

(g) Information from public and private sources; confidentiality of classified or privileged data

The Secretary may obtain from public sources, or purchase from private sources, any survey, data, report, or other information (including interpretations of such data, survey, report, or other information) which may be necessary to assist him in preparing any environmental impact statement and in making other evaluations required by this subchapter. Data of a classified nature provided to the Secretary under the provisions of this subsection shall remain confidential for such period of time as agreed to by the head of the department or agency from whom the information is requested. The Secretary shall maintain the confidentiality of all privileged or proprietary data or information for such period of time as is provided for in this subchapter, established by regulation, or agreed to by the parties.

(h) Information from all Federal departments and agencies; confidentiality of privileged or proprietary information

The heads of all Federal departments and agencies shall provide the Secretary with any nonprivileged or nonproprietary information he requests to assist him in preparing the leasing program and may provide the Secretary with any privileged or proprietary information he requests to assist him in preparing the leasing program. Privileged or proprietary information provided to the Secretary under the provisions of this subsection shall remain confidential for such period of time as agreed to by the head of the department or agency from whom the information is requested. In addition, the Secretary shall utilize the existing capabilities and resources of such Federal departments and agencies by appropriate agreement.

(Aug. 7, 1953, ch. 345, sec. 18, as added Sept. 18, 1978, Pub. L. 95-372, title II, sec. 208, 92 Stat. 649.)

§1345. Coordination and consultation with affected State and local governments

(a) Recommendations regarding size, time, or location of proposed lease sales

Any Governor of any affected State or the executive of any affected local government in such State may submit recommendations to the Secretary regarding the size, timing, or location of a proposed lease sale or with respect to a proposed development and production plan. Prior to submitting recommendations to the Secretary, the executive of any affected local government in any affected State must forward his recommendations to the Governor of such State.

(b) Time for submission of recommendations

Such recommendations shall be submitted within sixty days after notice of such proposed lease sale or after receipt of such development and production plan.

(c) Acceptance or rejection of recommendations

The Secretary shall accept recommendations of the Governor and may accept recommendations of the executive of any affected local government if he determines, after having provided the opportunity for consultation, that they provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State. For purposes of this subsection, a determination of the national interest shall be based on the desirability of obtaining oil and gas supplies in a balanced manner and on the findings, purposes, and policies of this subchapter. The Secretary shall communicate to the Governor, in writing, the reasons for his determination to accept or reject such Governor's recommendations, or to implement any alternative means identified in consultation with the Governor to provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State.

(d) Finality of acceptance or rejection of recommendations

The Secretary's determination that recommendations provide, or do not provide, for a reasonable balance between the national interest and the well-being of the citizens of the affected State shall be final and shall not, alone, be a basis for invalidation of a proposed lease sale or a proposed development and production plan in any suit or judicial review pursuant to section 1349 of this title, unless found to be arbitrary or capricious.

(e) Cooperative agreements

The Secretary is authorized to enter into cooperative agreements with affected States for purposes which are consistent with this subchapter and other applicable Federal law. Such agreements may include, but need not be limited to, the sharing of information (in accordance with the provisions of section 1352 of this title), the joint utilization of available expertise, the facilitating of permitting procedures, joint planning and review, and the formation of joint surveillance and monitoring arrangements to carry out applicable Federal and State laws, regulations, and stipulations relevant to outer Continental Shelf operations both onshore and offshore.

(Aug. 7, 1953, ch. 345, sec. 19, as added Sept. 18, 1978, Pub. L. 95-372, title II, sec. 208, 92 Stat. 652.)

Section 20

§1346. Environmental studies

(a) Information for assessment and management of impacts on environment; time for study; impacts on marine biota from pollution or large spills

(1) The Secretary shall conduct a study of any area or region included in any oil and gas lease sale in order to establish information needed for assessment and management of environmental impacts on the human, marine, and coastal environments of the outer Continental Shelf and the coastal areas which may be affected by oil and gas development in such area or region.

(2) Each study required by paragraph (1) of this subsection shall be commenced not later than six months after September 18, 1978, with respect to any area or region where a lease sale has been held or announced by publication of a notice of proposed lease sale before September 18, 1978, and not later than six months prior to the holding of a lease sale with respect to any area or region where no lease sale has been held or scheduled before September 18, 1978. The Secretary may utilize information collected in any study prior to September 18, 1978.

(3) In addition to developing environmental information, any study of an area or region, to the extent practicable, shall be designed to predict impacts on the marine biota which may result from chronic low level pollution or large spills associated with outer Continental Shelf production, from the introduction of drill cuttings and drilling muds in the area, and from the laying of pipe to serve the offshore production area, and the impacts of development offshore on the affected and coastal areas.

(b) Additional studies subsequent to leasing and development of area

Subsequent to the leasing and developing of any area or region, the Secretary shall conduct such additional studies to establish environmental information as he deems necessary and shall monitor the human, marine, and coastal environments of such area or region in a manner designed to provide time-series and data trend information which can be used for comparison with any previously collected data for the purpose of identifying any significant changes in the quality and productivity of such environments, for establishing trends in the areas studied and monitored, and for designing experiments to identify the causes of such changes.

(c) Procedural regulations for conduct of studies; cooperation with affected States; utilization of information from Federal, State and local governments and agencies

The Secretary shall, by regulation, establish procedures for carrying out his duties under this section, and shall plan and carry out such duties in full cooperation with affected States. To the extent that other Federal agencies have prepared environmental impact statements, are conducting studies, or are monitoring the affected human, marine, or coastal environment, the Secretary may utilize the information derived therefrom in lieu of directly conducting such activities. The Secretary may also utilize information obtained from any State or local government, or from any person, for the purposes of this section. For the purpose of carrying out his responsibilities under this section, the Secretary may by agreement utilize, with or without reimbursement, the services, personnel, or facilities of any Federal, State, or local government agency.

(d) Consideration of relevant environmental information in developing regulations, lease conditions and operating orders

The Secretary shall consider available relevant environmental information in making decisions (including those relating to exploration plans, drilling permits, and development and production plans), in developing appropriate regulations and lease conditions, and in issuing operating orders.

(e) Assessment of cumulative effects of activities on environment; submission to Congress

As soon as practicable after the end of each fiscal year, the Secretary shall submit to the Congress and make available to the general public an assessment of the cumulative effect of activities conducted under this subchapter on the human, marine, and coastal environments.

(f) Utilization of capabilities of Department of Commerce

In executing his responsibilities under this section, the Secretary shall, to the maximum extent practicable, enter into appropriate arrangements to utilize on a reimbursable basis the capabilities of the Department of Commerce. In carrying out such arrangements, the Secretary of Commerce is authorized to enter into contracts or grants with any person, organization, or entity with funds appropriated to the Secretary of the Interior pursuant to this subchapter.

(Aug. 7, 1953, ch. 345, sec. 20, as added Sept. 18, 1978, Pub. L. 95-372, title II, sec. 208, 92 Stat. 653.)

§1347. Safety and health regulations

(a) Joint study of adequacy of existing safety and health regulations; submission to President and Congress

Upon September 18, 1978, the Secretary and the Secretary of the Department in which the Coast Guard is operating shall, in consultation with each other and, as appropriate, with the heads of other Federal departments and agencies, promptly commence a joint study of the adequacy of existing safety and health regulations and of the technology, equipment, and techniques available for the exploration, development, and production of the minerals of the outer Continental Shelf. The results of such study shall be submitted to the President who shall submit a plan to the Congress of his proposals to promote safety and health in the exploration, development, and production of the minerals of the outer Continental Shelf.

(b) Use of best available and safest economically feasible technologies

In exercising their respective responsibilities for the artificial islands, installations, and other devices referred to in section 1333(a)(1) of this title, the Secretary, and the Secretary of the Department in which the Coast Guard is operating, shall require, on all new drilling and production operations and, wherever practicable, on existing operations, the use of the best available and safest technologies which the Secretary determines to be economically feasible, wherever failure of equipment would have a significant effect on safety, health, or the environment, except where the Secretary determines that the incremental benefits are clearly insufficient to justify the incremental costs of utilizing such technologies.

(c) Regulations applying to unregulated hazardous working conditions

The Secretary of the Department in which the Coast Guard is operating shall promulgate regulations or standards applying to unregulated hazardous working conditions related to activities on the outer Continental Shelf when he determines such regulations or standards are necessary. The Secretary of the Department in which the Coast Guard is operating may from time to time modify any regulations, interim or final, dealing with hazardous working conditions on the outer Continental Shelf.

(d) Application of other laws

Nothing in this subchapter shall affect the authority provided by law to the Secretary of Labor for the protection of occupational safety and health, the authority provided by law to the Administrator of the Environmental Protection Agency for the protection of the environment, or the authority provided by law to the Secretary of Transportation with respect to pipeline safety.

(e) Studies of underwater diving techniques and equipment

The Secretary of Commerce, in cooperation with the Secretary of the Department in which the Coast Guard is operating, and the Director of the National Institute of Occupational Safety and Health, shall conduct studies of underwater diving techniques and equipment suitable for protection of human safety and improvement of diver performance. Such studies shall include, but need not be limited to, decompression and excursion table development and improvement and all aspects of diver physiological restraints and protective gear for exposure to hostile environments.

8. You have provided the Committee with the land use stipulations for the ASRC Lands, Kaktovic, Alaska, and the draft operation stipulations for the Koniag ANWR Interest lands. Does the Department take the position that those stipulations are sufficient to adequately protect the environment of the Coastal Plain?

o What recommendations, if any, does the Department have to improve these stipulations?

ANSWERS:

The stipulations in both documents are adequate, when coupled with the site-specific stipulations that will be developed for individual activities. Thus, the Department has no plans to revise those general stipulations at this point in time.

The draft Koniag contract also contains a provision requiring oil and gas activities on exchanged lands, undertaken after regulations for the rest of the coastal plain are promulgated, to be in accordance with the Federal statutory and regulatory provisions governing such activities, as well as provisions in the contract not superseded by legislation or regulations. This further ensures protection of the coastal plain resources.

9. You made some references in your oral testimony not included in your prepared text regarding the relationship between any ANWR leasing legislation and the compatibility determination provisions of the National Wildlife Refuge Administration Act. Could you please restate your position and elaborate on that point?

ANSWER:

The National Wildlife Refuge System Administration Act requires that any activity permitted by the Secretary on any National Wildlife Refuge landsss must be compatible with the purposes for which that Refuge was established. Compatibility determinations are made on a site-specific, case-by-case basis. This ensures that any non-wildlife related activities on refuges such as grazing, haying, farming, do not in any way conflict with the wildlife purposes of the particular refuge. Under this standard, some activities that would be permitted on one area or on one refuge might be prohibited on another, depending upon the differing circum- stances involved.

However, Congress established a different standard for the seismic exploration program on the coastal plain of the Arctic National Wildlife Refuge, recognizing the unusual circumstances existing there. We believe those circumstances warrant a legislative alteration of the usual compatibility standard for oil-related activities there.

The Secretary has recommended that the standard for environmental protection regarding oil-related activities on the coastal plain be that of "no unnecessary adverse effects." To avoid unnecessary litigation and resulting delays and confusion, we further recommend that activities which meet the "no unnecessary adverse effects" test be legislatively deemed to be compatible for the purposes of the Refuge System Administration Act and other applicable laws which require compatibility determinations. We believe this would be the most effective and efficient means of conducting the leasing program, consistent with protection of the environmental values of the coastal plain.

10. How big is the Sadlerochit Springs special area where you propose no surface occupancy? Are you aware of any other areas in the Coastal Plain that would be treated similarly?

ANSWER:

The Sadlerochit Springs Special Area is approximately 4000 acres; encompassing the area within 1/2 mile on either side of the outlet stream and extends 1/4 mile each side of the river downstream approximately 5 miles.

The Department does not intend to establish additional Special Areas. Potential resource conflicts will be avoided by site-specific time and area closures incorporated into leasing regulations and permits. Examples of this approach include exclusion for fish-overwintering areas and areas where snow geese are staying.

11. I agree with your general proposition that all applicable Federal and State environmental laws should apply to leasing in ANWR. Given this position, why would you propose that rights-of-way in ANWR be issued without regard to the existing access provisions of Title XI of the Alaska Land Act?

ANSWER:

The existing access provisions in Section 1110(b) Title XI of the Alaska Lands Act would be considered to be too liberal in their grant of access to leases and other inholdings on the coastal plain. This would constrain the Department's ability to ensure no unnecessary adverse effects and no duplication of facilities. It would be especially important should the Congress consider and approve the potential land exchanges which would expand the system of inholdings on the coastal plain above the current KIC lands.

12. With regard to leasing systems to be used in ANWR, you say that you do not object to having any discretionary authority to use all of the methods permitted in the OCS Lands Act.

Isn't it true that some of these leasing systems, for example, work commitment bidding, could result in little or no revenue to the Treasury?

ANSWER:

As a result of extensive analysis and experimentation with alternative bidding systems under the OCS Lands Act, the Department concluded that the bonus bidding, fixed royalty system best achieves national energy policy goals. See the enclosed OCS Lease Sales and Evaluation of Alternative Bidding System (1983). It is true that some leasing systems, such as work commitment bidding, can result in little or no revenues to the Treasury. Other systems presented substantial negative impacts on incentives for leasing, exploration, development, and production.

13. Would you propose to offer all of the Coastal Plain of ANWR for leasing at once or would it be opened in stages?

ANSWER:

It would be our intention to follow a leasing process similar to that used to lease areas of the Outer Continental Shelf (OCS). In the OCS process an entire area is identified as available for leasing, subject to environmental findings during the NEPA compliance stages. In ANWR, to the extent the NEPA process concludes there is sufficient information regarding parts of the Coastal Plain to allow leasing, we would plan to offer those areas for lease. Those areas which would require additional information and analysis would receive this additional analysis and, depending upon the outcome, be made available for lease at a subsequent lease sale. Further, to the extent environmentally acceptable lands are not leased in initial sales, we would expect they would still be available in subsequent sales.

United States
Environmental Protection
Agency

External Affairs A-100AE
Washington DC 20460

EPA

Legislative Analysis

DEC 11 1987

Honorable J. Bennett Johnston
Chairman, Committee on Energy
and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On October 17, 1987 you sent several questions concerning disposal of wastes resulting from oil and gas activities in the ANWR to Richard Sanderson, Director of our Office of Federal Activities, who had testified on ANWR on October 13, 1987.

Our responses to your questions are enclosed. I apologize for our tardy response.

If I can be of further assistance, please let me know.

Sincerely,

A. Henry Schilling
Director, Office of
Legislative Analysis

enclosure

RESPONSES TO QUESTIONS FROM CHAIRMAN JOHNSTON

QUESTION 1: In the absence of a new provision in the ANWR legislation, what statute would govern liability for oil spills during exploration, development, or production? Does the Agency believe the statutory requirements provide adequate protection in the case of an oil spill or would you suggest that additional statutory requirements be imposed?

ANSWER 1: Liability for oil spills entering waters of the United States is currently governed by section 311 of the Clean Water Act (CWA). This includes spills during exploration, development, and production activities at oil and gas wells. Most of the area to be opened for oil and gas activities in the ANWR is Alaskan tundra. Tundra is considered to be a wetland, and therefore waters of the United States as defined in the CWA. Therefore, oil spills in ANWR would likely be subject to CWA section 311 jurisdiction.

Currently, EPA and the Coast Guard share responsibility for responding to oil spills to determine the necessary action, liability, and what fines should be levied (see E.O. 11735 and 40 CFR Part 300).

The Agency believes the current statutory requirements are adequate.

QUESTION 2: In the absence of a new provision in the ANWR legislation, what statute would govern handling and disposal of wastes, both hazardous and non-hazardous, during exploration, development, and production?

ANSWER 2: The handling and disposal of wastes would be governed by numerous legal authorities, including:

1. Clean Water Act (CWA)
2. Safe Drinking Water Act (SDWA)
3. Resource Conservation and Recovery Act (RCRA)
4. Clean Air Act (CAA)

QUESTION 2a: What wastes would be covered?

ANSWER 2a: Wastes from exploration and development activities generally include drilling fluids, cuttings from the material drilled through, ground water that enters the well during drilling, fluids contained in the oil and gas formations, and specialty fluids used to fracture the formation to enhance oil or gas production. Other specialty additives may be used to enhance the properties of the drilling fluids or to free stuck drilling pipe.

Wastes from production wells include "produced water" (sometimes called formation water) brought up with the oil or gas and separated at the wellhead. Other fluids used to maintain production levels, including bactericides, acids, or water injected into the formation, will also be separated from the oil and gas at the wellhead.

Currently, the Agency limits the discharge of free oil in drilling fluids, cuttings, and well treatment fluids from oil and gas wells drilled in wetland areas like the Alaskan tundra. Produced water from these wells would be subject to a limitation on the oil and grease content of 72 mg/l daily maximum, and 48 mg/l monthly average. Any well drilled onshore, but not in a wetland area would be subject to a limit of no discharge of these materials. Therefore, all muds, cuttings, treatment fluids, and produced water would have to be recycled, evaporated, or landfilled to ensure that they never enter waters of the United States. Any waste water discharged to waters of the United States would be covered by the NPDES permits, and discharges exceeding permitted levels or discharges without a permit would violate the CWA.

The Underground Injection Control program of the Safe Drinking Water Act regulates the subsurface emplacement of fluids into wells. The Safe Drinking Water Act prohibits underground injection of fluids that would endanger underground sources of drinking water (USDWs). All other underground injection is regulated by EPA or by States granted primary enforcement responsibility. Underground injection activities conducted by the oil and gas industry are generally coverd under the Class II program. All new Class II wells require a permit prior to injection. Injection of produced waters from oil and gas operations for disposal, storage, or for enhanced recovery operations is allowed by Class II permit. Injection of a RCRA hazardous waste, by contrast, requires a Class I UIC permit.

Wastes from the exploration, development, and production of crude oil, natural gas, and geothermal energy (primarily produced water and drilling muds and other associated wastes) are currently exempt from regulation under RCRA as hazardous wastes. As solid wastes, however, they are covered by Subtitle D of RCRA.

QUESTION 2b: Is there any litigation, or other administrative proceeding currently under way, that would add, or otherwise affect the types of waste that would be governed by waste disposal regulations? Please explain.

ANSWER 2b: The oil and gas industry has filed several court challenges to new general discharge permits issued under section 402 of the CWA (the National Pollutant Discharge Elimination System--NPDES) in Alaska and the Gulf of Mexico. The outcome of these challenges could affect the terms and conditions contained in NPDES permits issued for activities in ANWR, but would not likely affect the Agency's authority to regulate these discharges under the CWA. The Agency is also initiating development of effluent limitations guidelines based on Best Available Technology Currently Available (BAT), and New Source Performance Standards (NSPS) applicable to wells located in wetlands. These new limits and standards would supplant the existing effluent limitations guidelines currently in place for this subcategory which are based on Best Practicable Control Technology Currently Available (BPT), and would supplement the new proposed effluent limitations guidelines for the offshore subcategory of this industry.

EPA is also currently preparing a Report to Congress on Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy. The Report will be submitted to Congress by December 31, 1987 in accordance with a Consent Order resulting from a lawsuit by the Alaska Center for the Environment. Six months subsequent to the submission of this report the Administrator must determine whether or not these wastes should be regulated as hazardous wastes under Subtitle C of RCRA.

QUESTION 2c: Who would be liable in the event of a spill?

ANSWER 2c: The owner or operator of a drilling rig or the leaseholder for the property would be liable for any spill on the site.

QUESTION 2d: Does the Agency believe the statutory requirements provide adequate protection and liability coverage in the case of a hazardous waste spill, or would you suggest that additional statutory requirements be imposed?

ANSWER 2d: The Agency believes that current law provides adequate protection and liability coverage for such spills. Since the Agency has not concluded that wastes from oil and gas operations are hazardous wastes, as defined by RCRA, we must qualify to that extent our response to your questions regarding adequate protection and liability for spills of hazardous wastes. If the spill enters waters of the United States in violation of an NPDES permit, or where no NPDES permit has been issued, then the Agency's authority under the CWA would provide an enforcement mechanism. If the spill does not enter waters of the United States, then Alaska statutes would provide an enforcement action.

ARCO
Suite 1001
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036
Telephone 202 457 6200

October 30, 1987

The Honorable J. Bennett Johnston
U.S. Senate
136 Hart Senate Office Building
Washington, D.C. 20510

RE: **Arctic National Wildlife Refuge Comments**

Dear Senator Johnston:

I appreciated the opportunity to appear before the Senate Energy and Natural Resources Committee on October 14, 1987 to present ARCO's views on a development scenario for the Coastal Plain of the Arctic National Wildlife Refuge (ANWR).

As you requested, I am pleased to enclose ARCO's responses to the set of issue questions which you provided during the hearing. It is our hope that these comments will help clarify some of the issues of interest to you and other members of the Committee.

ARCO believes strongly that oil and gas development on the Coastal Plain can occur compatible with proper safeguards for protection of the arctic environment. We applaud your efforts to develop legislation which also reflects these considerations.

We stand always available to respond to additional questions and concerns which you might have in the future.

Very truly yours,

James D. Weeks

James D. Weeks
Manager
Prudhoe Bay Field Operations
ARCO Alaska, Inc.

JDW:DAW:gb

Enclosure:

1. How much of the Coastal Plain should be leased at any one time? Should there be one large lease sale or several smaller sales spread over time?

   The entire coastal plain should be included during the initial lease sale. Areas that were not selected or leased should be considered as part of exempt or newer small area lease sales. This would ensure maximum revenue to the government in royalty and bonus dollars. This type of lease sale activity would also provide an optional planning effort for industry and the agency in preparing for lease sales.

   In order for the industry to do an optimum job of fully evaluating the hydrocarbon resource potential of the area and develop a comprehensive and well coordinated plan for recovery of that resource with a minimum of surface impact, it is imperative that the entire area be available for leasing simultaneously. If the industry is forced by leasing constraints into a "piecemeal" (or "patchwork") type development, it will no doubt result in a less than optimum economic and environmental situation due to the necessity for redundant, small facilities which cover more cumulative area and lack economy of scale. Having access to large, continuous areas, on the other hand, will minimize capital and ecological risks through more fully integrated, properly scaled development."

2. Should certain areas, e.g. all weather springs and core caribou calving areas, be totally off limits to leasing, leased later, or at the same time as other areas?

   All existing areas of the coastal plain should be a part of the initial lease sale. However, this offering should include reasonable mitigation to ensure that wildlife and their habitat are given all necessary consideration/protection. Wildlife and habitat interests would be further considered during site specific surface facility permitting.

3. Should there be an "exploration only" option? Should the government do any or all of the exploration?

   An exploration only option should not be considered as this would have significant impact on the U.S. Treasury in terms of potential revenue lost. The probability of an exploration program without the related followup phases, e.g., production/development would not give the industry adequate incentive to be a part of the lease sale process. Further, if the explore only option is the decision, the delay in bringing oil into production would be delayed even further than presently anticipated. A government exploration program has two distinct possibilities. The first, if no oil is found, then the loss to the government by way of lost royalty and bonus bids would be incurred. The second, more attractive aspect, would be to find oil then the possibility would exist to attract higher bonus and royalty monies.

4. What general standard of mitigation/protection should be used, e.g. "no unnecessary adverse effect"; "no significant adverse impact, etc.?"

   We would prefer no standard language. Instead, reference to compliance with existing regulatory requirements will ensure optional protection of the environment while allowing reasoned development, recognizing that these standards change constantly, mandating the use of better management techniques and new technologies.

5. Should the LEIS for the Secretary's ANWR report be considered sufficient as a programmatic EIS for a leasing program?

   The LEIS should be considered as sufficient for this initial leasing program. Five years of environmental studies were used to provide the data on which the Secretarial decisions were made. In addition, a 20-year Prudhoe Bay data base was available. Also, this LEIS would be the appropriate document for initiating the leasing program to include exploration, discovery, delineation, and ultimate production.

6. How should NEPA apply to and interact with the leasing program beyond this initial stage?

   In the provision for a leasing program, consideration should be given to an expedited NEPA process which would/could be analogous to the TransAlaska Pipeline Act. This type of legislation should provide for an expedited process with definite, short timeframes.

7. Is there a need for additional authority with regard to the issuance of rights-of-way in the 1002 area?

   Additional authority in the form of Secretarial overview would aid in the ability to grant rights-of-way in an expeditious manner. This would also minimize private/state hold-ups when ROW grants are sought.

8. What kind of leasing model is most appropriate for ANWR - the onshore leasing program, the OCS program, or some combination of the two?

   A leasing model that should be given consideration is the one used by the Mineral Management Service (MMS) in its OCS lease sale procedure. The OCS competitive lease sale process is one with which the DOI is familiar. Another possible consideration is the State of Alaska Department of Natural Resources lease procedures.

9. What kinds of environmental stipulations, mitigation measures, etc. should the legislation contain? How specific should the legislation be in this regard? Some areas of concern include:

   a) availability of water and gravel

   b) air and water quality concerns including monitoring

   c) protection of fish and wildlife and their habitat

   d) various types of waste disposal

   e) consolidation of facilities

No stipulations or mitigating measures should be contained in any ANWR legislation that is developed. Very general legislation to "open" the ANWR would be appropriate as application of existing rules and regulations would not only provide adequate environmental protection during the placing of facilities, but would also provide the necessary impetus for a reasoned exploration of the ANWR Coastal Plain.

The areas of concern that are listed can be addressed fully in testimonies provided to House and Senate ANWR Committee Panels. The general overview of each point is provided as follows:

a) Water and gravel availability - the North Slope of Alaska has large quantities of gravel that have been generated by the rivers over eons of time. Gravel underlies virtually the entire North Slope. Water is not a scarce commodity on the North Slope. With techniques that have been developed for North Slope activity, such as, desalinization, snow usage, etc. adds further to the available water supply network.

b) Air and water quality - the existing rules and regulations have minimized pollution from any of our existing facilities. Man's intrusion into any environment will cause some short term minor impacts. We believe this impact has been discreet and highly manageable to date in our North Slope activity, and if ANWR is opened this will continue to be the case - deminimus environmental impacts with significant national benefit.

c) Protection of fish and wildlife - the existing laws and regulations plus our 20 years of North Slope operating experience has shown a high degree of protection exists for fish and wildlife. Also, our Prudhoe Bay and Kuparuk experience is evidence that oil and gas activity and wildlife can coexist.

d) Waste disposal practices - underground injection of liquid wastes is an environmentally sound method of disposal on the North Slope, the primary reason being the 2000 ft. permafrost layer. Injection under this layer minimizing any opportunity for environmental damage to occur.

e) Facility consolidation - the experience we have demonstrated on the North Slope has shown an increasing capability to consolidate our facilities. Technology has enabled us to reduce our drilling pad sizes, personnel quarters, operational units, and also consolidate facilities that are utilized by third party contractors. The best example of this third party consolidation is the KIC facility at Kuparuk.

10. What type(s) of leasing systems should be used?

The types of leasing systems that should be considered for oil and gas leasing are those similar to the MMS OCS lease provisions or the State lease provisions. Some of the highlights are royalty consideration of 12-1/2%, competitive leasing, and a minimum bid of $25/acre.

11. What should be the maximum size of the lease tracts in this area?

The maximum size of lease tracts should be 1/4 township size (9 square miles) with a minimum of 1/9 township size (4 square miles).

12. What should the lease term be and under what circumstances should such term be extended?

Primary lease terms should be for 10 years with an option to extend if the exploration drilling leads to discovery or if further exploratory drilling or production were to occur after the 10 year period has lapsed.

13. How should revenues from leasing in this area be distributed?

This is a matter of public policy -

14. Is there a need for expedited judicial review or special liability provisions?

An expedited judicial review would enhance the Secretary's ability to resolve any litigation, if such were to occur a normal judicial review with subsequent appeals would delay eventual leasing of the Coastal Plain.

15. Should a new state/federal interdisciplinary team be created to deal with leasing, production and development in ANWR?

    We believe there would be no value added by the creation of another layer of regulatory bodies. The existing regulatory framework has sufficient structure to deal with the eventual processes necessary to assure a reasoned leasing, production, and development of the ANWR.

16. Should there be a requirement for unitization of leases on the Coastal Plain?

    A legislated requirement for unitization would not be in the best interest of industry economics, as the industry has demonstrated, under the present systems that unit formations are driven primarily by economics and elimination of waste and are incorporated into lease sale provisions during the formal lease sale processes.

17. Should the Secretary of the Interior have lease cancellation authority in this area?

    The Secretary should have the same/cancellation rights as exist presently in the OCS lease sale process.

Chevron U.S.A. Inc.
1700 K Street, N.W., Washington, DC 20006

October 21, 1987

Submission for the Record
October 14, 1987 Hearing
Re: ANWR Coastal Plain

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOU
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The Honorable J. Bennett Johnston
Chairman Committee
 on Energy and Natural Resources
United States Senate
136 Hart Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

Thank you for providing the opportunity for Chevron to appear and testify on October 14, 1987 concerning leasing and development on the ANWR Coastal Plain. We appreciate the deliberate manner in which you have moved forward to identify the real issues involved in this debate.

At the hearing, you invited witnesses to respond to a number of issues in writing. Our responses are enclosed and are organized as follows:

Attachment I: Responses to the "Issue List for ANWR Leasing Bill.

Attachment II: Responses to questions raised by Senators which we felt should be clarified and elaborated upon.

Attachment III: Other issues important to the legislation which have not been adequately addressed at the hearings.

Witnesses at the hearing were also asked to respond to a series of questions from the Office of Technology Assessment. Those answers have taken longer to develop, but we will forward them to the Committee as soon as they are complete.

We hope our comments are helpful in drafting legislation which can be taken to markup. If there are any questions, or we can provide additional information, please contact Richard Hughes in our Washington, D.C. office at 457-5800.

Sincerely,

Thomas Cook

Thomas Cook
Exploration Representative- Alaska

cc: Members of the Energy Committee
 Selected Staff of the Energy Committee

ATTACHMENT I

ISSUE LIST FOR ANWR LEASING BILL

Question - How much of the Coastal Plain should be leased at any one time? Should there be one large lease sale or several smaller sales spread over time?

Response - All of the Coastal Plain should be offered to allow industry the opportunity to lease and drill those areas which have the best potential. This will not necessarily result in the entire Coastal Plain being leased at once since every tract in the Coastal Plain does not cover a prospect. Besides, industry will initially bid on tracts covering prospects in which they are the most confident, leaving the others to subsequent sales after further information has been gathered. By not restricting the area offered for leasing, a multitude of ideas will be tested in the most timely and efficient manner.

Additionally, regular reofferings should be available. In some cases, after industry evaluates tracts initially acquired, new information may suggest more attractive tracts. Regular reofferings are necessary so industry is not in a position where they are forced to drill on less than their best prospect or on lands offset by unleased acreage. ANWR legislation should mandate reofferings every two or three years.

Question - Should certain areas, e.g. all-weather springs and core caribou calving areas, be totally off limits to leasing, leased later, or at the same time as other areas?

Response - The only area which has been demonstrated to be sufficiently unique and sensitive to be of concern is the Sadlerochit Springs area. However, that area can be protected by restriction on general surface access and occupancy, allowing access to only specific areas under appropriate conditions rather than a prohibition on leasing. A lease with restricted surface access and occupancy would allow the subsurface resources, if any, to be tapped by directional drilling from designated locations on the lease without any impact on the sensitive areas of the surface or the springs.

A specific core caribou calving area has not been identified. Besides, oil and gas activity is not likely to have any effect on the herd other than limited displacement. Given DOI's estimate of significant potential in the Jago Highlands and considering all available evidence, it is inappropriate to create a presumption of harm to the caribou. Therefore, no areas should be withdrawn from leasing because of caribou calving.

Question - Should there be an "exploration only" option? Should the government do any or all of the exploration?

Response - The "exploration only" option totally undermines the purpose of the legislation -- to discover and produce oil and gas for the benefit of the nation. The best way to insure effective exploration and production of oil and gas in the Coastal Plain is to provide initially and with certainty what a lessee's rights and duties will be if oil and gas are discovered. Lessees will be more willing to invest significant sums of money if there is certainty about their ultimate interest in the lease.

The "exploration only" option will result in the testing of only limited areas. The entire body of exploration expertise available will thereby be reduced to one or a very limited number of concepts instead of the many and varied company concepts which might be applied to the Coastal Plain if it were opened to conventional leasing. It is the multiple hypothesis approach which has made the U.S. exploration industry the most effective oil finder in the world. Single hypothesis approaches have been used in many countries around the world, usually with disappointing results.

The question of who funds an exploration only program (government or industry) is really of secondary importance to the fact that the program is unlikely to find oil. While we can speak only for our company, we do not believe industry would be willing to underwrite the cost of what could be a billion dollar project. In our business, prospects compete against each other for available capital. Even though ANWR would be an attractive prospect under normal circumstances, the uncertainty about rights to develop and terms of development would likely cause our initial investment in such an exploration program to fail our economic standards. Consequently, our investment dollars would be directed elsewhere.

No increased environmental protection will result from government-operated drilling. Industry has developed the technology and expertise which has resulted in an excellent record of operating in environmentally sensitive areas.

Question - What general standard of mitigation/protection should be used, e.g. "no unnecessary adverse effect"; "no significant adverse impact, etc.?"

Response - The phrase "no significant adverse impact" should be rejected as a mitigation standard because the words "significant impact" have taken on a specific meaning under NEPA law. NEPA is an analysis tool; it does not compel an outcome. The term "significant impacts" merely triggers a certain type of analysis. A mitigation standard does compel an outcome; and therefore, that standard should be crafted to avoid confusion that would result from phrases such as "significant impacts" which are so laden with meaning under NEPA.

"No unnecessary adverse effect" appears to be a workable mitigation standard. This standard would establish a two-pronged test for operations to be restricted, modified, or prohibited. First, the operation would have to be found to have adverse effects; and second, the operation would have to be unnecessary to achieve the purposes of the activity -- presumably to discover and produce oil and gas from the Coastal Plain.

Legislative enactment of a mitigation standard such as "no unnecessary adverse effect" would eliminate much of the perceived need to include specific stipulations in the statute. Such a standard would provide assurance of environmental protection while allowing the operators and administrative agencies to accomplish other purposes of the legislation.

Question - Should the LEIS for the Secretary's ANWR report be considered sufficient as a programmatic EIS for a leasing program?

Response - The LEIS for the Secretary's ANWR report should be legislatively declared sufficient compliance with NEPA for the Secretary to proceed to the lease sale stage. Section 288 (b)(2) of S.1217 accomplishes this purpose but it should go further to include a prohibition on litigation.

The ANWR LEIS provides sufficient detail for the Secretary to establish appropriate leasing regulations and stipulations. Assistant Secretary Horn testified that the Department will require 18 to 24 months to prepare for a lease sale. Compounding this delay with the possibility of NEPA litigation before the lease sale could easily postpone development of the Coastal Plain by 5 or more years.

Question - How should NEPA apply to and interact with the leasing program beyond this initial stage?

Response - Beyond the leasing stage NEPA should apply to all surface disturbing activities, but application of NEPA does not necessarily mean that a full EIS must be prepared. In fact, we would expect that many activities preliminary to development and production could be analyzed through Environment Assessments in full compliance with NEPA and the CEQ regulations. Full EISs would be postponed until the point at which the most is known about the nature and location of operations; and therefore, the most is also known about the nature and location of impacts. This point we expect would be a plan of development and production.

Question - Is there a need for additional authority with regard to the issuance of rights-of-way in the 1002 area?

Response - The Secretary of Interior has authority under a variety of statutes to grant rights-of-way across federal land. Still, to avoid confusion about what authority may apply for the Coastal Plain, and to avoid any unforeseen gap in authority, the Secretary should be granted specific authority to grant rights-of-way in the Coastal Plain necessary to explore for, develop, produce, and transport oil and gas resources.

Question - What kind of leasing model is most appropriate for ANWR - the onshore leasing program, the OCS program, or some combination of the two?

Response - Both the onshore leasing program and the OCS program are designed to apply on an ongoing basis to huge amounts of acreage (more than 700 million acres onshore and over a billion acres offshore) where competing uses are many and varied. The ANWR Coastal Plain is a discrete parcel (1.55 million acres) with few -- although important -- competing uses. It, therefore, requires a special and specific program. As we mentioned above, the best program for the Coastal Plain would provide for offering the entire Coastal Plain and regular reofferings every two to three years. Below we address other important points such as stipulations, bidding systems, lease size, lease term, unitization, cancellation authority, and suspension authority.

Question - What kinds of environmental stipulations, mitigation measures, etc. should the legislation contain? How specific should the legislation be in this regard?

Response - As we stated above, legislative establishment of an appropriate mitigation standard will eliminate the need to constrain technology and innovation with specific legislative stipulations. Any specific concerns will be addressed in the NEPA analysis accompanying the permit process at each stage of operation. Again, with the goal of meeting a legislative mitigation standard, the operators and agencies can apply their collective expertise to accomplish the purposes of the Act.

Question - What type(s) of leasing systems should be used?

Response - S.1217 directs the Secretary to use bidding systems authorized in the OCS Lands Act. While we have no specific objection to such a broad grant of authority, we should point out problems which could be expected to result from a number of the bidding systems in the OCSLA.

Bidding systems which require relatively low initial investment for acquisition (such as variable royalty bid, variable work commitment bid, or variable net profits bid) provide little incentive for prompt exploration and development. Royalty and net profits bidding systems may result in leases with uneconomic royalty or net profit shares.

While it is prohibited in OCSLA, bidding systems with more than one variable totally distort the market and should not be used. If some system other than OCSLA is included in ANWR legislation, it should specifically prohibit multiple variable bidding.

In the nine years since enactment of the bidding systems section of OCSLA, the Secretary of Interior has experimented with a variety of systems and has concluded that the system most effective, efficient, and yielding the fairest return to the government is cash bonus bid with fixed royalty of not less than 12½ percent. The State of Alaska has elected to use a similar bidding system in recent years.

Question - What should be the maximum size of the lease tracts in this area?

Response - A maximum lease size of 2,560 acres as specified in Section 288

(A)(3)(c) of S. 1217 is appropriate. However, because many sections within the Coastal Plain are irregular, we suggest that S. 1217 be modified on Page 7, Line 9 to delete the phrase "more than" and substitute the phrase "the larger of four surveyed or protracted sections or".

__Question__ - What should the lease term be and under what circumstances should such term be extended?

__Response__ - Because of difficult operating conditions and seasonal limitations in the arctic, primary lease terms in the Coastal Plain should be at least 10 years. This is consistent with OCS and State of Alaska leases. Details regarding extensions should be developed through the regulatory process. The Committee has expressed concern about diligence provisions. We agree that such should be imposed as a condition of extension of leases. Thus, we propose the following modification of Section 288 (a)(3)(D) of S. 1217:

> "Each lease shall be issued for an initial period of ten (10) years and shall be extended for so long thereafter as oil and gas is produced in paying quantities from the lease or unit area to which the lease is committed or for so long as continuous drilling or reworking operations, as approved by the Secretary, are conducted thereon or for so long as such lease is subject to an approved unit agreement or suspension of production has been appropriately approved. Drilling or reworking operations shall be continuous so long as no more than one year elapses between the cessation of one operation and the commencement of another."

__Question__ - How should revenues from leasing in this area be distributed?

Response - There appears to be a number of competing interests which could benefit from the distribution of revenue derived from leasing and development in the Coastal Plain. All of these interests appear to be valid, and we take no position on appropriate distribution of revenue so long as the legislation does not attempt to accommodate too many interests by increasing royalties to an unreasonable level or imposing additional fees or taxes.

Question - Is there a need for expedited judicial review or special liablity provisions?

Response - Expedited judicial review will be essential for the Coastal Plain to be developed in a timely manner. To accomplish this we see the following elements as important to the legislation:

1. A coordinated permitting process must be provided to allow the variety of necessary permits to proceed simultaneously under specific time limits. This will allow reviews which are susceptible to litigation (e.g. NEPA, CZMA, Section 404, ANILCA Section 810, etc.) to be accomplished together.

2. A short (thirty day) statute of limitations on the commencement of actions challenging decisions of the permitting authority should be imposed. Also a requirement that any party filing an action must consolidate claims in single action will expedite review.

3. Jurisdiction should be limited to federal courts and consolidation of all suits concerning same action of the permitting authorities should be required. Time limits should also be imposed on the court's disposition of the suits.

Question - Should a new state/federal interdisciplinary team be created to deal with leasing, production and development in ANWR.

Response - The Division of Governmental Coordination, Office of Management and Budget serve to coordinate the permitting process in Alaska. While the federal government does not have a similar agency, any coordination necessary could be accomplished through interagency agreements among the permitting agencies. No additional governmental agencies are necessary.

Question - Should there be a requirement for unitization of leases on the Coastal Plain?

Response - Unitization should not be required, but it certainly should be authorized and encouraged. While some circumstances may arise where unitization is not appropriate, we would expect that in most cases it will be preferred by both the leaseholder and the government. In any event, we believe that the Secretary should be given the full authority to develop requirements found to be necessary and appropriate through the regulatory process.

Question - Should the Secretary of the Interior have lease cancellation authority in this area?

Response - We have no objection to the Secretary of Interior having lease cancellation authority so long as it is not exercised arbitrarily or without compensation to the lessee. Of course, the Secretary should have authority to cancel leases for violation of lease terms after appropriate notice, opportunity to be heard, and opportunity cure any violation. More difficult to administer is a right to cancel for environmental reasons. Such a right does exist in the OCSLA and we would refer the Committee to Section 5 (a) of the OCSLA, as amended, (43 U.S.C. 1334 (a)).

ATTACHMENT II

OTHER QUESTIONS BY SENATORS AT 10/14/87 HEARING

Question - Are there elements of drilling muds likely to be used in ANWR which would, but for the RCRA exemption, otherwise be considered hazardous waste?

Response - The vast majority of drilling muds which would be used in ANWR would not be classified as RCRA hazardous waste, even without the exemption. Oil base muds that may be used to meet specific down-hole requirements (e.g. prevention of damage to certain formations) may be classified as RCRA hazardous wastes only because of flammability characteristics. Specific requirements are imposed by State of Alaska regulations on the disposal of this type of mud.

Question - What assurance is there that adequate funds will be available to reclaim lands after operations are complete?

Response - Where an obligation to reclaim is established by contract or statute, it is enforceable in court and backed by the assets of the lessee.

Operators are required to post a performance bond for their operations on government lands. The bond is an assurance of some level of financial ability of the operator who is required to reclaim the lease regardless of the bond.

It was suggested at the hearing that restoration in the arctic might cost several times the cost of the original project. While that may be true for remote locations which have been long abandoned, we would note for the Committee that the restoration of our KIC exploration well (a $40-50 million project) was accomplished to the satisfaction of the Alaska Oil and Gas Conservation Commission and the U.S. Fish and Wildlife Service at a cost of under $650,000.00 (includes drill pad removal).

ATTACHMENT III

OTHER ISSUES NOT ADEQUATELY DISCUSSED AT HEARINGS WHICH WOULD BE ADDRESSED IN ANWR LEASING LEGISLATION

ANILCA Section 1003: This section contains a blanket prohibition on oil and gas development in ANWR. While any legislation opening the Coastal Plain probably repeals this section by implication, we believe the repeal should be explicit.

Definition of Discovery: The definition of discovery was discussed several times at the hearings in the context of triggering such events as leasing in the core-calving area and lifting "winter only" exploration restrictions to allow delineation drilling. Operational restrictions are best left to regulations or permits. However, if a definition of discovery becomes necessary in the legislation, we suggest a standard consistent with OCS Order No. 4 (Determination of Well Producibility) be used. A "discovery" should be deemed to have been made when it is shown that a well has been drilled which is capable of producing in paying quantities. Order No. 4 provides that a well is capable of producing in paying quantities when it is capable of producing oil and gas in quantities sufficient to yield a return in excess of operating costs. Information used to establish a well's capability includes wire line formation tests, drill stem tests, core data, and logs.

Participation of Independents: Section 288(a)(1)(E) of S. 1217 directs the Secretary to "conduct sales in a manner which will enable independent oil and gas producers, acting alone or in combination with other independent producers, to have a competitive opportunity to successfully bid...". While we certainly encourage the participation of all parties in the exploration and development of ANWR, we are concerned that the wording of this section may force the Secretary into bidding systems which are counterproductive to the purpose of finding and producing oil and gas. We noted a number of these problems in our earlier comments on leasing systems. To avoid these unintended results, we suggest that Section 288(a)(1)(E) be reworded as follows:

> "In the conduct of competitive lease sales under the authority provided by this Act, the Secretary shall seek to maximize revenue paid to the Treasury, but in doing so shall make reasonable efforts to conduct lease sales in the manner which will encourage oil and gas development by leasing lands to such companies or individuals that are reasonably capable of exploration for and development and production of oil and gas reserves on leases granted under the authority of this Act."

Miscellaneous Authorities: A number of authorities are generally considered necessary to accomplish exploration and production and many of these may be implied in an ANWR leasing bill. Nonetheless we suggest that the following should be made explicit:

- Authority to grant permits to conduct geological, geochemical, and geophysical surveys (including seismic) on leased or unleased lands in the Coastal Plain on a non-exclusive basis except that permits for surveys on leased lands shall require consent of the lessee.
- Authority to grant suspension of lease terms as necessary to compensate for delays in permitting, environmental review, litigation, construction of production or transportation facilities, and other force majeure.

EXXON COMPANY, USA RESPONSE TO
SENATE ENERGY COMMITTEE'S
ISSUE LIST FOR ANWR LEASING BILL

Question *How much of the Coastal Plain should be leased at any one time? Should there be one large lease sale or several smaller sales spread over time?*

Answer Exxon recommends the initial Coastal Plain sales cover the entire unleased area. Considering the length of time that will be required for exploration and any potential development, exploration will be able to proceed in a much more deliberate and steady pace.

Follow-up sales should occur on a regular schedule.

Question *Should certain areas, e.g. all-weather, springs and core caribou calving areas, be totally off limits to leasing, leased later, or at the same time as other areas?*

Answer Exxon recommends that the ANWR opening legislation not include off-limits areas. The record shows that operations can be conducted within an area such as the Coastal Plain in an environmentally sensitive manner. Exxon further believes that if environmental stipulations and controls are deemed necessary, they are most appropriately imposed at the stage of the Agency's review and approval of a lessee's proposed plan of operations, not before the lease sale stage. This approach ensures that environmental decisions will be based on and have the benefit of the EIS process (lease sale EIS for exploration and, if necessary, a development/production EIS), and a detailed description of the lessee's proposed activities. Thus, the Agency would have the flexibility to impose reasonable stipulations to mitigate any anticipated environmental harm without being overly restrictive.

In the case of all-weather springs, DOI may determine it is necessary to preclude surface occupancy within a specified area around such a spring, but that should not necessitate a prohibition of leasing or directional drilling to explore for and develop subsurface reserves.

With regard to the question of core calving areas, the scientific evidence indicates that (1) there are no specific or static core calving areas for the Porcupine Caribou Herd (PCH), (2) the availability of calving habitat is not a limiting factor on the size of the PCH, and, (3) caribou as a species are very flexible and readily adapt to the types of activities anticipated from oil and gas exploration and development. Consequently, we see no valid reason to defer leasing of any area of the ANWR coastal plain.

Question	*Should there be an "exploration only" option? Should the government do any or all of the exploration?*
Answer	Exxon believes that separation of ANWR exploration from development/production would be a serious mistake. Exploration rights have value only if successful bidders also have an assured right to develop and produce any resources which may be discovered. Loss of this assured right to develop one's own discoveries will discourage industry participation and substantially reduce competitive bids, thus diminishing return to the government. Furthermore, if oil and gas are discovered in an area, exploration

will likely continue for many years concurrently with development and production; separation of exploration and production would only delay the already anticipated lengthy process of ANWR development.

Exxon does not believe any one entity such as the government can adequately explore an extensive area such as the ANWR. The most effective petroleum development occurs when competing groups explore, applying different geologic skills and interpretations, and testing multiple concepts of how and where oil and gas may be trapped.

Additionally, we believe that it is private industry's role to take the risks associated with exploration, development, and production of oil and gas. The government's role is to establish fair laws and regulations under which private industry will operate and justly and impartially administer these laws. The federal government should not assume the risks associated with direct involvement in the operating phase of the effort. We therefore very firmly believe it is both unnecessary and inappropriate for government to take on the exploration function.

Question	*What general standard of mitigation/protection should be used, e.g. "no unnecessary adverse effect," "no significant adverse impact," etc?*
Answer	Exxon supports "no unnecessary adverse impact" to the environment as the general standard of mitigation/protection. This standard must include a balancing of environmental concerns with feasible technology and appropriate economic factors.

Question *Should the LEIS for the Secretary's ANWR report be considered sufficient as a programmatic EIS for a leasing program?*

Answer Exxon strongly recommends that the LEIS for the Secretary's ANWR report be deemed sufficient under NEPA for the first lease sale within ANWR. We believe the combination of this LEIS plus the extensive debate before Congress will ensure realization of NEPA's objective of a reasoned and environmentally sensitive decision-making process. This approach will also avoid a duplicative commitment of government and public manpower and financial resources in preparing what is, in our opinion, an unnecessary EIS for the first ANWR lease sale. Additionally, this approach has already been approved and used by Congress for the NPRA leasing legislation program.

Question *How should NEPA apply to and interact with the leasing program beyond this initial stage?*

Answer Exxon believes that, though the LEIS is sufficient for the first lease sale, Congress should adopt a leasing program which applies and incorporates NEPA in a manner similar to that currently used by DOI. The Department prepares an EIS for each lease sale. This EIS provides the foundation for all the Department's subsequent decisions to approve or disapprove a lessee's proposed operations. DOI also prepares an environmental assessment for each Plan of Exploration and each Plan of Development/Production. These environmental assessments consider not only the information in the lease sale EIS, but also the potential environmental impacts associated with the lessee's proposed site-specific operations, including any cumulative impacts resulting from multiple operations.

This process allows the Department the flexibility to tailor stipulations or permit conditions to address the environmental concerns associated with these operations while at the same time avoiding unnecessary restrictions. Additionally, DOI may require the preparation of an EIS if it determines that there will probably be a significant unmitigable impact.

Question *Is there a need for additional authority with regard to the issuance of rights-of-way in the 1002 area?*

Answer Exxon recommends that Congress authorize a central transportation corridor and give DOI authority to approve rights-of-way for pipeline and transportation access to production which may arise from ANWR, Alaska state waters, or the OCS.

Question *What kind of leasing model is most appropriate for ANWR - the onshore leasing program, the OCS program, or some combination of the two?*

Answer Exxon believes that the leasing model most appropriate for ANWR is a competitive, sealed-bid auction. Where applied, this leasing system has proved to be the most effective method for allocating exploration and development rights and securing fair market value for public resources.

Question *What kinds of environmental stipulations, mitigation measures, etc. should the legislation contain? How specific should the legislation be in this regard? Some areas of concern include:*

- *availability of water and gravel*
- *air and water quality concerns including monitoring*
- *protection of fish and wildlife and their habitat*
- *various types of waste disposal*
- *consolidation of facilities.*

Answer Exxon believes that environmental stipulations and mitigation measures should not be included in legislation. If necessary, these measures are best imposed after a lease sale has taken place and when the DOI is reviewing a lessee's plan of operations. This approach, as noted earlier, allows the Agency to tailor the environmental stipulations and mitigation measures deemed necessary in such a way that they address the specific environmental concerns associated with the lessee's proposed operations, including any cumulative impacts from multiple operations.

Imposing environmental stipulations in the ANWR opening legislation will effectively prevent DOI from considering new or improved technology or new information concerning potential impacts. This could lead to overly restrictive stipulations which would unnecessarily increase the cost of exploration/development and the ultimate cost to the consumer. The procedure proposed above by Exxon would facilitate input from interested and knowledgeable parties on the need for such measures.

Considering the scope and number of existing federal, state, and local statutes, regulations, and requirements for North Slope operations, Exxon believes the listed areas of concern are already well protected. In addition, we believe the following facts should also tend to allay these specific concerns:

- Gravel availability. There is not a shortage of gravel in the Coastal Plain. 14,000 seismic boreholes were drilled throughout the area during seismic exploration, showing virtually the entire area is underlain by shallow gravel deposits.
- Water availability and water quality.. Water resources available to oil and gas development in the Coastal Plain are adequate. Sources include natural lakes, ponds, and rivers; artificial impoundments to catch runoff and snowmelt; snow traps and melters; and desalination of nearby seawater.
- Air quality. Studies and monitoring of the operations around Prudhoe Bay show that air emissions are only a small percentage of the national and state standards.
- Protection of fish and wildlife and habitat. Existing environmental programs by federal and state agencies are adequate for the overall protection of fish, wildlife and habitat. Areas of special concern could be addressed by more specific stipulations or mitigation measures developed by DOI at the lease sale or operating stages, including monitoring and studies.
- Waste disposal. EPA and ADEC waste management programs adequately cover both solid and hazardous waste disposal in ANWR. New state waste disposal regulations became effective in September 1987.

- Consolidation of facilities. Consolidation of facilities in the oilfields of the North Slope is a normal result of efforts to reduce the high costs of Arctic development. Existing environmental programs to minimize habitat use also result in consolidation of facilities. An ANWR leasing policy which encourages unitization of exploration and production would also serve to consolidate management and facilities. A statutory requirement to consolidate facilities, per se, is not needed.

Question *What type(s) of leasing systems should be used?*

Answer Exxon recommends competitive leasing using cash bonus as the bid variable. We recommend against use of non-cash variables such as net profit share, royalty rate, or work commitment as bidding variables. Lease rentals should be fixed and nominal. Contingency payment should be a fixed 1/8th royalty. Other contingency systems, e.g. net profit share, are needlessly complicated and impose substantial accounting and administrative burdens on both industry and government. Use of non-cash bidding systems and non-royalty contingency systems has already been evaluated by DOI in a five year test program of federal oil and gas leasing systems. The evaluation concluded that a system using a variable cash bonus and a low fixed royalty rate was the preferred bidding system.

Question *What should be the maximum size of the lease tracts in this area?*

Answer We believe that a tract size of 2560 acres is appropriate for the area. This tract size would be effective in distributing exploration risk and, at the same time, promote a competitive lease market in which many companies may participate. This is also the tract size presently designated by DOI survey and the size currently used by the State of Alaska for North Slope leases.

Question *What should the lease term be and under what circumstances should such term be extended?*

Answer Considering the remoteness of the ANWR, the difficulty in operations, the time periods required for environmentally responsible exploration, and what will likely be a very complicated regulatory process for approval of operations, we believe the primary term for leases should be 15 years. This will allow a lessee a reasonable opportunity to place its lease on production during the primary term of the lease. The lease should continue so long thereafter as (1) oil and gas are produced from the leased area in paying quantities, (2) drilling or reworking operations are being conducted on the leased area, (3) operations are suspended under approved Plans of Exploration or Development, or (4) force majeure has been declared.

Question *How should revenues from leasing in this area be distributed?*

Answer We believe this question is inappropriate for a potential lessee to answer.

Question *Is there a need for expedited judicial review or special liability provisions?*

Answer Exxon recommends that Congress provide a mechanism similar to that used under the OCSLA for expedited judicial review concerning challenges to lease sales and plans of operations.

We see no need for any new special liability provis
applicable state and federal laws, potential ANW
already fully responsible.

Question *Should a new state/federal interdisciplinary team b*
with leasing, production, and development in ANWR?

Answer Any congressionally approved ANWR leasing program
provision allowing the State of Alaska, local gover
and the public the opportunity to provide inpu
development/production decisions. However, we s
that the final decision-making authority remain
government. No new regulatory entity needs to be

Question *Should there be a requirement for unitization*
Coastal Plain?

Answer We recommend that ANWR legislation authorize
supports unitization of leases for the purpose o
maximizing ultimate recovery, protecting corr
avoiding unnecessary wells.

Question *Should the Secretary of the Interior have lease cancellation authority in this area?*

Answer An effective, environmentally sensitive leasing program must include the authority for the Secretary to cancel leases if it is determined that further exploration, development, or production cannot occur without serious adverse unmitigable impact to the environment, and the advantages of cancellation outweigh the advantages of continuing the lease in effect. Of course, any cancellation of lease rights must recognize the lessee's constitutional rights for compensation of all costs incurred.

The Standard Oil Company
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Washington, D.C. 20037
202 785-4886

STANDARD OIL

November 16, 1987

The Honorable J. Bennett Johnston
U.S. Senate
Washington, D.C. 20510

Dear Senator Johnston:

RE: Response to OTA Questions

Attached is Standard Alaska Production Company's answers to the arctic technology questions posed by the Office of Technology Assessment. You asked that these answers be supplied to the Senate Energy Committee to aid in your deliberations of the ANWR issue.

It is reasonable to observe that all the points raised by the Office of Technology Assessment questions have been dealt with by testimony and comments during the Senate Energy Committee's extensive hearings during the past few months. However, the attached answers sometimes give extra details which may be of value to you.

Yours Sincerely,

Roger C. Herrera

Attachments
cc: Tony Bevenitto
Daryl Owen
Tom Williams

The Standard Oil Company
is the original Standard Oil
founded in Cleveland, Ohio
in 1870

STANDARD ALASKA PRODUCTION COMPANY RESPONSE TO THE OFFICE OF TECHNOLOGY ASSESSMENT

1. Which of the major oil and gas technologies for the Arctic are significantly different from that used in temperate climates/regions?

The existence of the 2000 feet thick permafrost formations required development of creative drilling and casing techniques. High viscosity freshwater muds employed in other areas were identified as effective in drilling permafrost formations. Cement designed to develop compressive strength at sub-freezing temperatures are used to support steel casing which isolate the permafrost from other formations. The casing grades used across permafrost have been specifically selected such that the pile retains its toughness and ductility necessary for handling at arctic temperatures.

Gravel pads placed on the tundra and special pilings to support buildings and production facilities are designed to insulate the structure from the permafrost. Thawing of the ice in the permafrost near the surface results in subsidence which would be structurally damaging to surface facilities. Additionally, the piles for pipe support and buildings are frozen in place securely stabilizing them to prevent movement and damage. Subsurface safety valves are used on wells as an additional environmental protection. In other regions, such devices are restricted to offshore operations Drilling rigs and surface facilities are insulated (enclosed) as protection from the arctic temperatures. Steel casings, wellheads, and other materials, exposed to the elements undergo cyclic temperature tests to ensure that the specially selected metals properly function.

Along the Trans-Alaska Pipeline System, refrigeration was required for buried pipelines to prevent ice melting in the permafrost. The buried pipelines were insulated with polyurethane foam three inches thick then placed in a fiberglass jacket and continually cooled by special refrigeration systems in the permafrost beneath the line.

2. What major technologies required significant research and development for use in Prudhoe Bay when it was built?

Prevention of thaw subsidence was a major concern. Construction of facilities, gravel pad thickness, pipeline supports, and other structural concerns were developed to prevent permafrost thaw. The extent of permafrost thaw caused by producing wells and the resulting effect on well casing was studied in order that well spacings and well construction materials would be compatible with Arctic conditions.

Significant research on geomembrane liner selection of use in secondary containment facilities has been done. Liners must be chemically compatible with substances contained and physical performance characteristics compatible with the severe arctic environment. Liner research is ongoing.

3. What are the best examples of Arctic "State-of-the-Art" technologies for each of the categories in the OTA table?

   (See attached Table 1)

4. What major technologies are new developments in 1987 and were not available when Prudhoe was developed in the mid 1970's?

Non-conventional drilling (high angle: 82°+, or horizontal wells: 90°), minimodule construction for facilities, measurement-while-drilling logging, and coiled tubing conveyed logging are relatively new techniques; however, none are restricted to arctic use.

5. What are the major needs for developing new technologies for future exploration and production in ANWR?

   None.

6. What technologies are now under development and may be available (when?) for future use in ANWR?

Additional development of non-conventional drilling, high departure (reach) development, and coiled tubing conveyed logging and workovers can be expected gradually over the next several years. Drilling rig equipment systems with further capabilities to separate liquid and solids so that more fluids can be injected are being examined and may be available for ANWR.

7. What numbers, sizes and configurations or gravel pads for wells, facilities, pipeline, roads, airstrips, marine docks, etc., would be most likely for ANWR development? How do each compare with Prudhoe? Kuparuk? Endicott? Are the EIS estimates of gravel requirement reasonable? What are the determining factors in selecting designs for gravel pads?

Some reduction in number of pads can be expected in future pad-type developments as high-departure (extended reach) drilling and production operations continue to develop. The size of gravel production pads will likely decrease from those used to develop Prudhoe Bay because of use of minimodule facilities, reduction in reserve pit volumes required, and closer well spacings than original Prudhoe Bay wells. This reduction in size of the reserve pit and pad will result in a smaller "footprint" from gravel placement on the tundra for future facilities.

The determining factors for gravel pad design are those previously discussed. Module size, production volumes and types, well spacing, reserve pit volume, number of wells and onshore vs offshore location all impact the size and design of pads.

8. What drilling muds and mud systems would be most likely to be used in ANWR? What factors determine industry's selection of mud system designs?

The most likely candidates for mud systems in ANWR are those that have been successful in other North Slope fields. Weighted lignosulfonate, polymer, and oil based muds have application in arctic regions but are not unique to Alaskan oilfields. Drilling fluids are selected based on the following criteria: cost effectiveness, reservoir damage potential, cementing requirements, wellbore stability, deviation concerns and hole cleaning. The majority of North Slope drilling operations use water based polymer and lignosulfonate muds. However, some state-of-the-art drilling operations such as high-angle and horizontal drilling require the lubricating properties of oil-based muds. Also, some coring operations require oil-based muds to minimize core damage during drilling. Generally oil-based muds are used for drilling only the short productive intervals in non-conventional wells. Fresh water muds would be used up until the oil based mud is required.

9. What estimates of fresh water needs and sources are available for ANWR operations----exploration through production? What techniques are planned for developing water supplies and where have these been used?

Methods that could be utilized to satisfy water needs on the North Slope include: deep pools created in or adjacent to rivers/stream beds that will not freeze to bottom, deep pools created in lakes, desalination of sea water, erecting snow fences to trap snow and utilizing snow melters, insulating lakes to keep them from freezing to the bottom and converting gravel extraction pits to reservoirs. For exploratory sites, water could be backhauled from approved locations if necessary. All of these options have been tried successfully for one or more of the 250 exploratory wells drilled in the arctic desert.

The following scenario was developed for an exploratory well water requirements:

(1) 414,000 gallons of water per mile for construction of an ice road.
4,200 gallons of water per mile for daily road maintenance.

(2) 2,500,000 gallons of water for construction of a Hercules airstrip.
2,100 gallons of water for daily maintenance.
(Volume would be less if airstrip is built on a frozen lake.)

(3) 25,000 gallons of water daily for drilling rig and domestic use.

For development operations, water requirements would depend on the size of the development, number of wells and the size of the support camp. The operations would most likely utilize developed water reservoirs from river deadarms (former river channels) deepened by gravel extraction or from the desalination of seawater. Water withdrawn from gravel extraction pits during the winter would be quickly replenished during the subsequent spring snowmelt. Currently, Prudhoe Bay Development Drilling Operations consume approximately 630,000 gallons of water per well.

10. What is the current status of directional drilling technology? What developments may be available in the next 10 years? Where are the best examples of state-of-the-art directional drilling? What factors affect the selection of well spacing and clustering in specific field development designs?

Turbine mud motors, bit technology, drilling assemblies and measurement-while-drilling (MWD) logging have provided great improvement in accuracy and reliability of directional drilling. Horizontal and high-angle drilling has become an increasingly acceptable development tool for oil and gas exploration. MWD has reduced the time involved in monitoring directional drilling progress. Steerable mud motors, gyro MWD and more flexible drilling assemblies all are examples of rapidly developing technologies related to directional drilling.

Future developments could allow location of directional sensors in or near the bit that will allow directional measurements to be taken closer to the bit. MWD technologies could supply the industry with "look-ahead" capabilities such that the bit could be steered toward a target based on actual logging measurements, not on interpolated data.

The best examples of directional drilling are the horizontal and high angle well operations employed worldwide. The wellbore is tunneled horizontally through the reservoir.

Factors affecting well spacing and "clustering designs" are as follows: clustering of wells in the productive formations is affected by drainage patterns, enhanced oil recovery, reservoir quality and geologic considerations; surface spacing is affected by rig designs, access to facilities, flowline arrangement, reserve pit size and design and other environmental or topographic considerations.

11. What is the status of well design technology to counter problems of permafrost melting and ground subsidence?

No serious ground subsidence has been identified in ongoing production operations which have been resulted in risk to wells, surface facilities, human health or the environment. Casing design and metallurgy, permafrost cementing techniques, and computer modeling are examples of efforts to eliminate the risks of thaw subsidence.

12. What is the status of Arctic pipeline design and construction technology? What examples of pipelining would be most likely for ANWR development? What factors affect selection of winter-only construction practice?

Construction technology for vertical support members for pipelines and pile support structures in permafrost areas includes freezing the piles in place with gravel/slurry systems for stabilization and to prevent movement. Additionally, metal piles for buildings are capped with concrete to prevent heat transfer from the buildings through the piles into the permafrost. If ice in the permafrost melted, subsidence and structural damage could occur. Elevated pipelines have proven to be successful in allowing for passage of caribou in the Arctic and should therefore be utilized in ANWR.

For instances where the pipeline and road separation do not allow the use of the road to construct the pipeline, winter-only construction from ice roads is preferred. However, winter-only construction can add further costs through ice road requirements and may delay production. Additionally, there are maintenance and safety considerations if pipelines do not have adjacent roads.

13. What technological changes or improvements may be applied to ANWR that would significantly improve economics of oil production there?

Additional drilling and production technological advances that would allow for increased departure wells (develop more acreage from each pad) would likely reduce development costs. The greatest economic potential lies in EOR development. Producing the billions of barrels that remain classified as "unrecoverable" throughout the oil fields of the world would overshadow most, if not all, drilling and production potential technologies.

14. What specific facilities and equipment may be unnecessary to provide for ANWR development because they are available and usable at Prudhoe?

The only Prudhoe Bay facilities that would serve ANWR as well are some road systems, the Deadhorse Airport (initially as a staging point) and the Trans Alaska Pipeline. Other usable facilities could include:

Prudhoe Bay medical facilities
Machine shops
Communication relay point
Back-up equipment
Contract labor camps (VECO, etc.)
Warehouses for many sub-contractors
Hotels for visitors and stand-by crews
North Slope Borough landfill
North Slope Borough incinerator

15. Are there any special characteristics of ANWR (compared to Prudhoe), that would markedly affect selection of technologies and systems for exploration, development and production?

No.

16. What technologies are under development or now available to improve recovery from any Arctic oil field? Where and how may these be applied in the Alaskan North Slope?

Arctic oil fields are not homogeneous. The geographic location has little to do with the location, geologic quality, or quantity of potential reservoir rocks. The reservoir varies even within the Prudhoe Bay Area; each has its own recovery scenario. Gas reinjection, gravity drainage, miscible injection and waterflood are all ongoing recovery techniques within PBU and are not unique to Arctic reservoirs.

17. Of the mitigation measures recommended in the EIS (see Attachment 2), which are practices with economic impacts, and which would require technology improvements?

(See Attached Table 2)

TABLE 1-ARCTIC OIL AND GAS TECHNOLOGY CATEGORIES

Category	Arctic Technology
A. Exploration/Development	
1. Drilling and Drilling Systems	
o Drill Rig/Drilling -Lifting-Pipe Handling	
o Drill Pipe/Bits/Down Hole Drills	
o Casing/Cement	Permafrost cement
o Circulation (Muds, etc.)	
o Coring and Logging	
o Directional Drilling	
o Blow-out Prevention	
o Permafrost Protection	Permafrost cement
2. Support Systems	
o Transport of Equipment	Ice roads - exploration Ice airstrips - exploration Rolligons
o Personnel Support/Camp	Isolation/Sociological studies
o Supply of Operations	
o Construction of Drill Pads/ Supply Base	5 foot gravel pads and ice pads for exploration
o Waste Disposal	Exploration reserve pits below-ground with permafrost for containment
B. Production	
1. Well Systems	
o Casing/Tubing/ Perforation/Cementing	Metallurgy/ Permafrost cement
o Well Head/Flow Control	Ball valves
o Permafrost control	Cement, Metallurgy
2. Separation and Treatment	
o Gas Separators	
o Other Treatment	
o Handling Produced Water	
o Storage and Pumping	
o Control Systems	
3. Fluid Injection	
o Gas	
o Water	

TABLE 1-ARCTIC OIL AND GAS TECHNOLOGY CATEGORIES

Category	Arctic Technology
4. Auxiliaries	
o Power	
o Hotel and Base Facilities	Interior design focused for environmental/psychological problems related to darkness/isolation.
o Re-supply and Transportation	Sealift - short timeframe for open water transport of modules.
o Waste Disposal	Injection of liquids into zone exempt as drinking water source with shale and permafrost as confining layers.
o Road and airfields	5 foot gravel on tundra
o Oil spill control and cleanup	Snow and ice utilized for containment and sorbent
o Water supply	
5. Construction Operations	
o Gravel pads/Foundation/ Site Preparation	5 foot gravel pad Thermo piles in gravel pads under some foundations to prevent subsidence.
Transportation of Modules	Sealift - (short open water) Minimodules
Construction of Docks/Piers	
Construction Equipment	Gravel bag placement clamshell
C. Transportation	
1. Oil through TAPS	
o Construction of Pipelines/ Pumping Stations	Earthquake proof, insulated Buried pipeline refrigeration systems
o Pipeline Operation	Drag reducing agent developed to increase throughput.
o Permafrost Protection	Buried pipeline refrigeration systems/Insulated pilings
o Control/Inspection	
2. Gas	
o Gas Pipeline --- overland	
o Methanol	
o LNG	

TABLE 2 - RECOMMENDED MITIGATION MEASURES
ASSOCIATED COSTS AND TECHNOLOGICAL REQUIREMENTS

1. **Limit oil exploration, except surface geology studies, to November 1-May 1 (exact dates to be determined by Refuge Manager). Cease exploration activities and remove or store equipment at an approved site by May 15. Local exceptions may be made.**

Comment: Allowing operations on a year-round basis will considerably reduce costs. Exploration costs will figure prominently into the ultimate success of any exploratory effort in ANWR because it will dictate the number of exploratory wells that are ultimately drilled. The recent KIC well, for example, was 15,000', required two seasons to drill and cost approximately $50 million. If costs remain this high, it is fair to predict that the number of exploratory wells that are drilled in ANWR will be limited and may not adequately assess the resource potential. The complicated nature of the geology demands that if the full potential of ANWR is to be realized, industry will have to drill at least 20 wells. Recent examples of exploratory efforts limited by costs and lack of encouraging results include the Gulf of Alaska, Lower Cook Inlet, St. George Basin, and Navarin Basin, where only 6-10 wells were drilled in each area. If less than 28 exploratory wells had been drilled in the North Sea, there would not be production there today.

Operations which continue into the summer can be virtually self-contained. Major supplies can be transported to location during the winter and stored onsite. Disturbances from summer operations will be very localized and would provide an opportunity for early biological monitoring and evaluation. Given the minimal local effects that might be associated with a summer exploratory drilling operation, it would be more reasonable to have a mitigation measure that reads as follows: "Oil exploration should be allowed year-round except in those areas where summer activity would have an unnecessary adverse impact on wildlife populations."

2. **Consolidate, site, construct, and maintain facilities and pipelines to minimize effects on sensitive fish and wildlife habitats and species. Locate nonessential facilities outside concentrated caribou calving areas.**

Comment: In general, the consolidation of facilities holds economic incentives associated with lesser gravel quantities and lower construction costs. On the other hand, the siting of facilities to avoid sensitive habitats is usually associated with increased costs. For example, rerouting access roads usually means increased lengths. During a recent winter exploratory operation (Sag Delta #11), the changed route of an ice road to avoid a potential fish overwintering site added approximately one million dollars to the cost of the road. The avoidance of concentrated calving areas may not only be associated with increased costs but with increased habitat modification and should be considered carefully. While we support the concept of consolidating facilities and designing all structures to minimize effects on the environment, a flexible approach is necessary. It would be most appropriate to include a feasible and prudent qualifier. For example: "...Locate nonessential facilities outside concentrated caribou calving areas where feasible and prudent."

3. Design all bridges and culverts to handle at least 50-year flood events.

Comment: This is a standard engineering practice and will not require technological improvements, just site specific technological review. It should be recognized, however, that other factors will be involved in the final design criteria for each structure and that it would be appropriate to include the words "feasible and prudent".

4. Use ice or gravel-foam-timber pads, where feasible.

Comment: In most cases, gravel is the preferred option from both an operational and economic standpoint at this time. Gravel is the preferred construction material for drilling and facility pads because of its integrity. Gravel pads are more dependable and require less maintenance compared to the alternatives requiring the use of timber and/or foam. Gravel sources are abundant and its removal costs should therefore be very reasonable. Regardless, it should be understood that for production facilities, where long term stability and strength are critical, gravel has proven to be the most feasible option. However, flexibility should be maintained for pad design so that if new materials or techniques are developed that would minimize the footprint on the tundra, they can be utilized.

Foam-timber pad construction has the associated costs of the basic materials, their transport to the North Slope, and increased maintenance requirements. One of the disadvantages with foam is that it can break down and erode into smaller pieces that are very difficult to effectively remove from the tundra.

5. Prohibit: gravel removal from active stream channels on major fish-bearing rivers; winter water removal from fish-bearing waters, or springs and tributaries feeding into fish-bearing waters; spring, summer, or fall water removal from fish-bearing waters to levels that will not easily pass fish or maintain quality rearing habitat.

Comment: The technology for compliance with this stipulation exists. Obviously, the alternative methods will have different associated costs that can be evaluated on a site-by-site and seasonal basis.

6. Elevate pipelines to allow free passage of caribou or place ramps or bury as feasible.

Comment: Elevating pipelines to a height that allows caribou to easily pass beneath (150 cm, 5 ft) is a mitigation measure that has proven to be effective in the Prudhoe Bay area. Studies of the use of gravel ramps over pipelines by caribou have shown that the frequency of crossing pipelines with ramps is no different than for elevated pipelines without ramps, although caribou may preferentially use ramps if they are available. Given that ramps typically cost in excess of $250,000 and do not enhance the ability of caribou to cross pipelines, they are not justified as routine mitigation. The 5 foot pipeline height is effective "routine" mitigation.

There are technical problems with burying pipelines in areas with ice-rich soils, which are common on the North Slope. Burying would destroy the insulating layer, causing ice to melt in summer, which would lead to erosion and general soil stability problems. The use of elevated pipelines is a proven and effective mitigating measure and should be the primary approach to ensuring the free passage of caribou throughout the 1002 area after development.

The major advantage of elevated pipelines is that they facilitate pipeline surveillance, routine maintenance and the visual detection of spills or other problems.

7. Separate roads and pipelines 400-800 feet, depending on terrain, in areas used for caribou crossing.

Comment: Pipeline/road separation is not essential for free passage but it may be one method to increase the rate of caribou crossing of a pipeline and road. There is reduced crossing success only when all of the following occur; (1) there is a road next to a pipeline and (2) there is heavy traffic (3) during the mosquito season (July). Under these conditions there are several mitigation options: (1) ramp, (2) traffic control, (3) separation, or (4) pipeline burial. Any one of these provides sufficient mitigation. A recent study in the Kuparuk Oilfield that found separation of road and pipeline by at least 300 feet did increase the caribou crossing rate. This provides an alternative mitigation measure to constructing gravel ramps, pipeline burial and/or traffic control. The effectiveness of this mitigation measure should examine the specific site and take into consideration several factors, including soil stability, habitat type, drainage and costs. Mitigation measures should be employed only where they are feasible and prudent.

8. Construct docks and causeways so that fish movements are not impeded and lagoon water chemistry is basically unchanged.

- -

Comment: All alternatives to a solid fill causeway have serious economic consequences. Two breaches in the Endicott causeway, for example cost $36 million to construct. Cost associated with a pile supported causeways would have been several orders of magnitude greater, and were equated with the "no project" alternative on the basis that development would have been uneconomic.

We support the inclusion of breaches to assure fish passage; however, it should be recognized that this stipulation establishes an impossible standard with respect to lagoonal water chemistry as it is extremely variable both temporally and spatially. Water modeling through the use of computers can characterize coastal waters in terms of what is expected under certain river discharge flow conditions, wind velocities, and whether it is early season or late season. The high natural variability from year to year makes it difficult to establish a "baseline" condition from which to model.

9. Avoid construction in coastal areas near river systems with topographic relief or bluffs; otherwise minimize construction activities along the coast through the denning period, approximately mid-March. Minimize activities along the coast during late October-early November when polar bears come ashore to den.

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Comment: It is important to understand that if oil is found in economic quantities, construction of development facilities will only be efficient and cost-effective if operated on a year-round basis. It should also be noted that avoidance of one area means relocation to another area and this is usually associated with increased transport requirements, therefore increased costs.

10. Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and infrastructure essential to move inland beyond the restricted zone; drill pads and production facilities could be allowed within the zone 1.5 to 3 miles from the coast on a site-specific basis.

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Comment: This recommended mitigation measure is surprising since the further south oil field facilities are sited, the greater the potential exposure of calving caribou to those facilities, and the greater the contact with migrating herds. On the other hand, there are increased technological difficulties associated with construction near the coast due to potential flooding, storm surges and greater permafrost variability. While recognizing that there are engineering problems inherent in siting facilities very close to the coast, we take the position that oilfield support facilities should be clustered, close to the coast as feasible and prudent, consistent with environmental hazard considerations and reservoir considerations. Logic dictates that flexibility be retained for siting surface facilities until after oil accumulations are known.

11. Prohibit surface occupancy in the Sadlerochit Spring Special Area.

Comment: This is a reasonable stipulation.

12. Minimize surface occupancy in immediate vicinity of areas identified as supporting _Thlaspi arcticum_. Include information on identification and need for avoidance of _Thlaspi arcticum_ in all environmental orientation briefings.

Comment: There are geobotanical survey costs and potential relocation costs associated with this stipulation. It should be noted that this species is not legally protected and there are no data suggesting that it has ever been threatened by development.

13. Use bear-proof fencing around certain facilities; develop solid waste management plans; incinerate putrescible waste daily; prohibit wildlife feeding; institute employee education programs as appropriate.

Comment: Cost associated with proper waste disposal are expected and appropriate. An effective bear-proof fence, however, has not been developed. Furthermore, inappropriately sited fencing can cause excessive snow drifting. This mitigation measure should focus solely on waste management and should clarify that all waste disposal will be in accordance with appropriate state and federal regulations.

14. Inventory project areas for cultural resources, evaluate resources, and implement mitigation to avoid or minimize impact.

Comment: While there are associate costs, such an inventory is a standard prior to site clearance for large scale activities.

15. Prohibit off-road vehicle use within 5 miles of all pipelines, pads, roads and other facilities, except by local residents engaged in traditional uses or if otherwise specifically permitted.

Comment: Off-road travel will be especially necessary if roads and pipelines are separated for surveillance and maintenance purposes. The technology exists to operate vehicles with low pressure tires specially designed to minimize surface impacts. The operation of these vehicles should be on a permit-only basis.

16. **Establish time and area closures or restrictions on certain surface activity such as exploration, vehicle movements, and other activity that can be reasonably rescheduled, in areas of wildlife concentration during muskox calving, April 15-June 5; caribou calving, May 15-June 20; caribou insect harassment, June 20-Aug 15; snow goose staging, Aug. 20-Sept. 27; and fish overwintering and spawning.**

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Comment: It should be recognized that certain construction work such as placement and compaction of unfrozen gravel must be carried out during the July-mid-September period. Also, field production operations must continue on a year-round basis; free access being essential at all times. There could be major costs associated with intermittent work stoppage during the delineation, construction or production phase of oilfield development, as well as with seasonal exploration operations. See comment on stipulation no. 1.

We are concerned that the goals of time and area closures be reasonable. The aim should be to avoid serious disturbance, not all disturbance. This aim can be achieved to a significant degree through worker education (Mitigation Measure 27).

17. **Limit use of development infrastructure, roads and airstrips to persons on official business.**

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Comment: This is a reasonable stipulation both from the standpoint of safety and wildlife protection. No unnecessary costs or technological requirements.

18. **Reinject drilling muds, cuttings, and other wastes where geologically feasible. Remove hazardous wastes off refuge to an approved disposal site.**

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Comment: Drilling muds disposal is adequately handled under revised Alaska Solid Waste Management Regulations. Reinjection of drilling muds may not always be technically feasible and is only viable as a limited option when the solids content in the fluid is low enough to ensure that the fluid can be injected without plugging the well.

Injection, however, is the safest and most effective way to deal with many liquid wastes in the Arctic. The absence of underground sources of drinking water in the Prudhoe Bay area make injection a particularly safe management practice. EPA preapproves the zones for injection of waste through the Underground Injection Control (UIC) Program. Onsite injection eliminates the potential risks associated with shipping.

Not only are there significant environmental advantages to onsite disposal of hazardous waste, but the costs are significantly less than for offsite. The current cost for the disposal of hazardous waste at Prudhoe Bay is $32 per barrel versus $646 per barrel for offsite disposal.

A better mitigation measure would require the operator to provide treatment, storage and disposal of hazardous wastes in accordance with the numerous federal and state laws and not to preclude the use of a hazardous waste disposal well in ANWR.

19. **Close areas within 3/4 mile of high-water mark of specified water courses to permanent facilities and limit transportation crossings. Gravel removal may occur on a site-specific basis.**

Comment: It is difficult to quantify the costs of area closures prior to knowing where the oil accumulations are. It should be noted that existing state standards require a 500 ft. setback from major rivers and a 100 ft. setback from all other fish bearing streams and lakes. These standards have been effective, and no biological justification has been given for the greater distances specified here.

20. **Prohibit use of explosives or other noisy activities within 2 miles of raptor nest sites April 15-August 31 (June 1 if nest is unoccupied), unless specifically authorized by the FWS.**

Comment: Time and area closures can be costly. See comments on mitigation measures no. 1 and no. 16. This distance should be reduced to 1 mile. Even during the nesting period, raptors are not acutely sensitive to noise and other disturbances.

21. **Prohibit ground level activity, permanent facilities, and long-term habitat alterations (material sites, roads, and airstrips) within 1 mile of known peregrine or other raptor nest sites April 15-August 31 (June 1 if nest is unoccupied) unless specifically authorized.**

Comment: A 1-mile buffer zone appears reasonable. See preceding comment.

22. **Survey suitable habitat annually to locate nesting peregrines and other raptors.**

Comment: There will be site biological survey costs associated with any major operation.

23. **Establish no-activity zone of at least 1/2 mile around any confirmed polar bear den.**

Comment: If a polar bear should choose to den closer than 1/2 mile from an already-established facility or activity site, an exception to this measure should be made. Shut-in costs, and rerouting of existing transportation corridors would be prohibitive.

24. **Close area within 5 miles of development and associated infrastructure to hunting, trapping, and discharge of firearms, except for subsistence uses only, on a site-specific basis, where there will be major effects on those uses.**

Comment: We concur with this stipulation. We believe that the possession of firearms should be prohibited for all employees and government agency representatives within the vicinity of oilfield facilities (except in the case of law enforcement officers).

25. **Develop and implement plans for control, use, and disposal of fuel and hazardous wastes.**

Comment: See comment on mitigation measure no. 18.

26. **Monitor populations, productivity, movements, and general health of key species. Research measures to further minimize adverse affects of development. Implement corrective actions.**

Comment: Monitoring programs are very costly and often lack the focus to be effective. Approximately $5 million a year is spent on the gathering of new data at Endicott, and that level of work will continue into the future. Over $20 million has been spent on fish research alone at Endicott, and no end to the work is in sight. So much data has been gathered that it cannot all be thoroughly reviewed and analyzed by the resource agencies, and one has to question the benefits of such major scientific monitoring programs.

If they are to provide useful information, monitoring programs must be kept highly focused. Except in the case of small, localized populations such as the Howe Island snow goose colony, it is extremely doubtful that productivity or "general health" of wildlife populations could be meaningfully determined from field studies, or that baseline conditions against which to measure change in these factors could be established. Even if changes in productivity or "general health" could be measured in wildlife populations, how could one know whether such changes were linked to petroleum development?

The most effective monitoring, in terms of mitigating potential adverse effects on large mammals and snow geese, is to track the movements of larger groups when in the vicinity of activity centers, so that road traffic (e.g., in the case of caribou) or aircraft overflights (in the case of staging snow geese) can be temporarily restricted in ways that are genuinely responsive to the actual locations of animals. Studies of parameters such as "productivity" or physiological condition in the field would be far beyond the scope of a lessee's responsibility to monitor for mitigative purposes.

27. **Provide: environmental orientation briefings for workers; program for monitoring development activities; continuation of fish and wildlife population monitoring; follow-up programs to evaluate effects.**

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Comment: See the above comment. Provided field monitoring is realistic, properly focused and cost-effective, and provided the developer has a major role in technical design and evaluation of such monitoring and any follow-up programs, we believe these standard mitigative provisions are reasonable, though costly.

28. **Develop plans in conjunction with area residents and organizations to properly manage impacts on communities.**

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Comment: This requirement is important, not only as part of the local permitting process, but in order to minimize adverse impacts on local communities and on subsistence activities.

29. **Develop and implement an approved rehabilitation plan as part of the appropriate permit stages.**

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Comment: Rehabilitation plans are normally included as a section in the Plan of Operations. Rehabilitation costs are variable depending on the methods used.

NO.	MITIGATION MEASURE - Summarized	Standard/ Reasonable	Additional Costs Associated	Potentially Prohibitive Costs Associated	New Technology Required
1	Winter Exploration Only			•	
2	Consolidation of facilities, avoidance of sensitive habitats, and location of nonessential facilities outside of core calving areas	•	•	•	
3	Bridges and culverts to handle 50 yr. flood event	•			
4	Gravel pads, Foam/timber pads	•	•		°Foam and timber not prudent or feasible for production facilities
5	Gravel removal restrictions Water removal restrictions	°In most cases	•		
6	Elevated Pipelines and caribou ramps or buried pipelines	•	•	°Ramps	°Buried pipeline in ice rich soils
7	Separate roads and pipelines 400-800 ft.	°Reasonableness will vary on a site specific basis	•		
8	Construct Docks and Causeways so that fish movements are not impeded and water chemistry is unchanged.	°Fish movements	°Fish movements	°Water chemistry	
9	Avoid Construction in coastal areas. Restrict activities Oct.-March when polar bears are denning		°May require additional transportation costs	°Time restrictions	
10	Restriction on surface occupancy in coastal area (3 mi.)	Not necessarily in the best interest of caribou	•	°Depending on location of reserves	
11	Prohibit surface occupancy in Sadlerochit Spring area	•	•		
12	Avoid Thlaspi arcticum	No evidence that this is a threatened species	•		
13	Bear proof fencing and waste management	° Waste management	•	°Bear proof fencing (will cause snow drifts)	°Bear proof fencing
14	Inventory cultural resources	°For major projects	•		
15	Restrictions on off road vehicles	°Exceptions may be necessary for pipeline inspection and maintenance			
16	Time and area closures		•	•	
17	Limit public access to those on official business	•			
18	Reinjection of Drilling Muds Remove hazardous waste-oil refuge	•	°Significant cost associated with removal of hazardous waste		°Not technically feasible to reinject all muds
19	Area closure within 3/4 mi. of high-water mark		•		
20	Time and area closure for use of explosives-raptor protection-2mi.	°Distance should be reduced to 1 mile	•		
21	Prohibit ground level activity within 1 mile of raptor nest	•			
22	Requires annual raptor surveys in suitable areas	•			
23	No activity 1 mile around polar bear dens	°Unless bear establishes den after facility is in place			
24	Hunting and trapping restrictions	•			
25	Plans for control, use, and disposal of fuel and hazardous waste	•			
26	Biological monitoring programs	°Only if highly focused	•	°Longterm large scale research requirements	
27	Environmental Orientation briefings	•	•		
28	Coordination with local residents and organizations	•	•		
29	Development of rehabilitation programs	•	•	°Potential for excessive requirements	

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October 20, 1987

Senator Bennett Johnston
Chairman
Senate Energy and Natural
  Resources Committee
136 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Johnston:

The purpose of this letter is to supplement the October 14, 1987 testimony of Oliver Leavitt, Vice President for Lands, Arctic Slope Regional Corporation, before the Senate Energy and Natural Resources Committee.

During the hearing on the future management of the coastal plain study area you requested Mr. Leavitt to supplement his testimony by: (1) furnishing responses to a three page questionnaire distributed by Committee staff; and (2) to furnish legislative and, where appropriate, report language to implement the recommendations made in Mr. Leavitt's testimony.

I am enclosing for the Committee's hearing record Mr. Leavitt's responses to the Committee's questionnaire. Also enclosed for the record is a chronology on the history of government institutions, oil and gas development, and the Native people of Alaska. I will submit for the record legislative language to implement Mr. Leavitt's recommendations by the end of the week.

Mr. Leavitt and I appreciated the opportunity to appear before the Committee. We are available to assist the Committee's inquiry into this matter in any appropriate way. As you know, proper resolution of the coastal plain study area issue is of profound importance to the Inupiat Eskimo people and to the Nation.

Sincerely,

William J. Van Ness

William J. Van Ness

Enclosures

cc: Tom Williams
Mike Harvey
Daryl Owen

Responses
of
Oliver Leavitt
Vice President
Arctic Slope Regional Corporation
to
October 14, 1987 Questionnaire
of the
Senate Energy and Natural Resources Committee

October 20, 1987

1. How much of the Coastal Plain should be leased at any one time? Should there be one large lease sale or several smaller sales spread over time?

Arctic Slope Regional Corporation (ASRC) recommends that all of the lands located within the coastal plain study area be leased by competitive bid. ASRC believes these lands should be leased in two or more sales to maximize revenue and to insure the participation of the largest number of companys. All of the sales should, however, be held and concluded before successful bidders on leases have drilled any exploratory wells. Any areas which the Committee determines require further monitoring should be leased subject to relevant conditions concerning the purposes and possible outcomes of the monitoring program.

2. Should certain areas, e.g. all weather springs and core caribou calving areas, be totally off limits to leasing, leased later, or at the same time as other areas?

ASRC supports appropriate protection for Sadlerochit Springs and other all weather springs or unique areas. See page 11, subsection (k) of Mr. Leavitt's testimony.

ASRC does not support delaying or deferring leasing of the lower Jago River area, referred to by some witnesses as a "core calving area," of the coastal plain study area. ASRC's views are set forth at page 7, subsection (e) of Mr. Leavitt's testimony.

3. Should there be an "exploration only" option? Should the government do any or all of the exploration?

ASRC is opposed to both "exploration only" and to authorizing the government to engage in exploration activity in the coastal plain study area. All of the "exploration only" options discussed to date are grossly inadequate to test the huge potential of the 26 major prospects identified in the Resources Assessment Report, let alone the potential of numerous structural traps which are not identified in the Report, but are known to exist. Prudhoe Bay was not discovered until after 10 dry holes had been drilled. This experience is instructive for the coastal plain study area.

The Federal government should not be authorized to engage in coastal plain exploration. The government lacks expertise and experience and has other pressing demands on its human and fiscal resources.

4. What general standard of mitigation/protection should be used, e.g. "no unnecessary adverse effect"; "no significant adverse impact, etc?"

See Mr. Leavitt's testimony at pages 7 and 8, subsection (f).

5. Should the LEIS for the Secretary's ANWR report be considered sufficient as a programmatic EIS for a leasing program?

Yes. The Resource Assessment Report and LEIS on the coastal plain study area represent over five (5) years of extensive studies of the resources of the area as set out by the Congress in section 1002(h) of ANILCA. The Assessment Report and LEIS and the hundreds of supporting reports, studies and investigations they represent provide a more than adequate basis for a programmatic EIS for a competitive leasing program.

6. How should NEPA apply to and interact with the leasing program beyond this initial stage?

See Mr. Leavitt's testimony at page 12, subsection (O). Subsequent or "post-leasing" phases of exploration and development should be subject to NEPA requirements on a tiered basis. That is, relevant data and information contained in the coastal plain LEIS may be incorporated by reference and appropriately relied upon in subsequent EIS documents required under existing law for exploration, development and production of the coastal plain.

7. Is there a need for additional authority with regard to the issuance of rights-of-way in the 1002 area?

ASRC's attorney is reviewing the right-of-way authority question and will submit information for the record.

8. What kind of leasing model is most appropriate for ANWR - the onshore leasing program, the OCS program, or some combination of the two?

ASRC supports a competitive bonus bid model, patterned after the OCS Act, for the leasing of lands in the coastal plain study area.

9. What kinds of environmental stipulations, mitigation measures, etc. should the legislation contain? How specific should the legislation be in this regard? Some areas of concern include:

- availability of water and gravel
- air and water quality concerns including monitoring
- protection of fish and wildlife and their habitat
- various types of waste disposal
- consolidation of facilities.

See Mr. Leavitt's testimony at page 5, "(a) Land Use Planning Process"; page 6, "(b) Lands Leased" and "(c) Monitoring and Research"; page 7, "(d) Land Reclamation Responsibility" and pages 7 and 8, "(f) Environmental Regulatory Standard".

10. What type(s) of leasing systems should be used?

See Mr. Leavitt's responses to questions 1, 3 and 8.

11. What should be the maximum size of the lease tracts in this area?

ASRC supports the standard Alaska lease tract size of 2,560 acres, with two limited exceptions. The first exception would permit some smaller tracts if that is determined necessary by the Secretary to achieve the objectives of the "independent producer" language of S. 1217 at pages 13 and 14 of Mr. Leavitt's testimony, subsection (R)(i).

The second exception would permit the Secretary the discretion to lease a few tracts of sizes up to 3,840 acres where necessary to accommodate odd shaped tracts along boundaries and to maximize bonus bid revenues.

12. What should the lease term be and under what circumstances should such term be extended?

ASRC recommends that the standard lease term and extension provisions of the Federal mineral leasing laws be utilized. The Committee may wish to review Alaska State law and experience which appear to have operated satisfactorily in the Arctic environment.

13. How should revenues from leasing in this area be distributed?

See Mr. Leavitt's testimony, pages 9 and 10, subsection (g).

14. Is there a need for expedited judicial review or special liability provisions?

ASRC supports adoption of expedited judicial review. See Mr. Leavitt's testimony at page 14, subsection (r)(ii) "Litigation and Delay".

With respect to "special liability provisions" see Mr. Leavitt's testimony at page 7, subsection (d), "Land Reclamation Responsibility", and at page 13, subsection (q) "Other Environmental Considerations", which discusses the "strict liability" provision of the Trans-Alaska Pipeline Act.

15. Should a new state/federal interdisciplinary team be created to deal with leasing, production and development in ANWR?

ASRC supports the concept of a joint State-Federal Committee to be involved in implementing Congressional policy in areas where there is shared or joint jurisdiction. It should, however, be clearly understood that Federal lands are involved in the coastal plain and any State-Federal Committee is assisting in implementing Congressionally established policy in areas where State concerns or jurisdiction overlap with Federal responsibility.

16. Should there be a requirement for unitization of leases on the Coastal Plain?

Yes.

17. Should the Secretary of the Interior have lease cancellation authority in this area?

Yes, subject to traditional due process and Fifth Amendment standards.

CHRONOLOGY

HISTORY OF ALASKA AND THE PENDING CONGRESSIONAL DECISION ON THE EXPLORATION AND DEVELOPMENT OF THE OIL AND GAS POTENTIAL OF THE COASTAL PLAIN OF THE ARCTIC NATIONAL WILDLIFE REFUGE

SELECTED DATES AND EVENTS
1867-1987

1867	Secretary of State Seward signs treaty to purchase Alaska from Russia for $7.2 million ("Seward's Folly"). Treaty of Cession provides that "'uncivilized Native tribes' to be subject to such laws and regulations as the United States may from time to time adopt in regards to aboriginal tribes of that country."
1867-84	Alaska is governed, first by the Army, then by the Collector of Customs, then by the Navy.
1878	Beginning of salmon industry; first canneries established.
1880	First important discovery of gold in Alaska (Juneau).
1884	The Organic Act makes Alaska a District with an appointed governor and other officers; protection is provided for lands used and occupied by Natives.
1890	Barter Island (site of the current village of Kaktovik) serves as an important commercial whaling stop and key trading post up until 1910.
1902	First commercial oil discovery near Katalla on Gulf of Alaska; field produced until 1933.

1906	Native Allotment Act provides first opportunity for Alaska Native people to obtain land under restricted title.
1912	Alaska becomes a Territory with a two-house legislature; Capital in Juneau, Alaska.
	Alaska Native Brotherhood, first Native association to advance Native interests, is founded in Sitka, Alaska.
1919	Presence of surface oil seeps on Alaska's North Slope, long known to the Natives, is described by Leffingwell in U.S. Geological Survey (USGS) Professional Paper No. 109.
1923	By Executive Order, President Harding sets aside a 23 million acre Naval Petroleum Reserve No. 4 (PET-4) on Alaska's west-central North Slope.
1924	Citizenship Act extends citizenship to all Alaska Natives.
1926	Native Townsite Act provides opportunity for Native people to obtain restricted deeds to village lots.
1934	Provisions of Indian Reorganization Act are extended to Alaska allowing Secretary of Interior to designate Native Reserves.
1940s	First elements of Distant Early Warning (DEW) Line system installed on Barter Island.
1944	U.S. Navy drills first of several exploratory wells in Naval Petroleum Reserve No. 4 (now the National Petroleum Reserve-Alaska), and discovers natural gas at one well near Barrow, some 200 miles west of Prudhoe Bay.

1945	U.S. Coast and Geodetic Survey begins mapping the Beaufort Sea coast bringing some employment to Eskimo people.
1957	Swanson River oil field discovered in Alaska's Cook Inlet and the Kenai National Wildlife Refuge; oil and gas production has taken place in the Kenai Refuge since 1962.
1958	Congress approves the Alaska Statehood Act; any right or claim by the State of Alaska to Native lands is disclaimed; State is entitled to select 102.5 million acres of vacant unappropriated public lands. Statehood Act provides in Section 28 that State is entitled to 90 percent of royalties received from Federal oil and gas leasing of public lands in Alaska under the Mineral Leasing Act of 1920.
1959	Court of Claims rules that Indian (aboriginal) title of Tlingit and Haida Indians in Southeast Alaska was not extinguished by actions of the U.S. Government and that they were entitled to compensation for lands taken from them by the United States.
1960	Arctic National Wildlife Range (ANWR), consisting of 8.9 million acres, is established by Public Land Order 2214 in December 1960 for fish and wildlife conservation purposes.
1961	Land selections by the State of Alaska under the Statehood Act threaten the use of Native lands in the Minto area. Inupiat Paitot (North Slope Eskimo group) formed to protect aboriginal land rights.
1962	"TUNDRA TIMES", first Statewide Native newspaper, is established.
1963	Proposed Rampart Dam construction by Corps of Engineers is protested by Natives living in villages along the Yukon River.

1964 Good Friday Earthquake hits Alaska on March 27th.

First exploratory well drilled on Federal leases on the North Slope by private industry.

First State of Alaska oil lease sale on North Slope on lands selected by the State is conducted.

Kaktovik Village, previously moved several times to accommodate military DEW Line and Air Force operations on Barter Island, is moved again to its present site.

1965 Second State oil lease sale conducted on North Slope; sale includes the Prudhoe Bay discovery area.

First onshore well drilled in Canada's Mackenzie River Delta, east of ANWR.

1966 Statewide conference of Native leaders leads to organization of Alaska Federation of Natives (AFN) to advance Native land claims and other matters of common concern.

Secretary Udall imposes an informal "land freeze" to protect Native use and occupancy after protest by North Slope Eskimos to proposed oil and gas leasing on lands which they claim by occupancy and aboriginal title.

ANWR is included in the National Wildlife Refuge System. Administration of Refuge System permits the use of wildlife refuges for mineral leasing (oil and gas development) so long as such use is "compatible with the purposes for which the area was established."

1967 First bills are introduced in the Congress to settle the Alaska Native land claims.

Native protests and claims to land now encompass 380 million acres of Alaska (some claims are overlapping).

Drilling begins on Prudhoe Bay State No. 1 oil well by Atlantic-Richfield on April 26th.

Prudhoe Bay oil field is discovered on December 8th by Prudhoe Bay State No. 1 oil well.

1968 Alaska Land Claims Task Force, established by Governor Hickel, recommends 40 million acre land settlement.

On March 13th, upon completion of confirmation well, Sag River No. 1, oil companies publicly announce the discovery well at Prudhoe Bay; Prudhoe Bay field determined to contain an estimated 9.6 billion barrels of crude oil and 26 TCF of natural gas.

Alaska Natives and The Land, a study commissioned by Senate Interior and Insular Affairs Committee's Chairman, Senator Henry M. Jackson, provides first comprehensive compilation of data and information on the demographic, social and economic conditions of the Alaska Native people; report concludes that Alaska Native land claims appear to be valid as a matter of law; proposes a framework for a legislative settlement.

1969 State competitive oil lease sale of lands near Prudhoe Bay on September 10 produces over $900 million in bonus bid revenue for Alaska.

Plans disclosed for construction of 800 mile Trans-Alaska Pipeline from Prudhoe Bay to Valdez, Alaska.

1970 An Alaska Native land claims bill is passed by the Senate, but House does not act; the Alaska Native people are disappointed in the bill's land grant provisions.

1971 Significantly different bills pass both houses of Congress; resolution of issues requires a conference committee; compromise version is agreed to and passes both House and Senate.

Following acceptance of the bill's provisions by the AFN convention, President Nixon signs the Alaska Native Claims Settlement Act (P.L. 92-203) (ANCSA) on December 18, 1971.

In summary, the Settlement Act:

- -- extinguished Native aboriginal claims to all lands in the State of Alaska;
- -- granted $462.5 million in Federal funds to be paid over ten years to Natives through corporations owned by them;
- -- granted 2 percent over-riding royalty from State and Federal lands in amount of $500 million (virtually all paid out of State royalty);
- -- granted Native corporations the right to select 44 million acres from Federal lands in Alaska not selected by the State or dedicated for a special purpose such as parks, refuge, oil reserve or military withdrawal;
- -- provided for establishment of 12 Native Regional Corporations on ethnic, language and cultural boundaries and assigned responsibilities for administration of the settlement, (Artic Slope Regional Corporation is the Eskimo regional corporation for Alaska's North Slope);
- -- provided for establishment of Native Village Corporations for each of the over 200 villages in Alaska;
- -- provided for enrollment of most Alaska Natives in both a Village Corporation (if a resident of a village) and a Regional Corporation;
- -- protected Native subsistence uses by vesting significant surface estate in the Village Corporations; and
- -- generally granted all subsurface estate beneath the Village lands and other lands to the Regional Corporations and assigned to them economic development and management responsibilities.

Section 17(d)(2) of ANCSA (the "D-2 Lands" provision) authorized and directed the Secretary of the Interior to withdraw up to 80 million acres of public lands in Alaska suitable for future consideration for inclusion in National Park, Forest, Wildlife Refuge and Wild and Scenic River Systems.

Section 12(a)(1) of ANCSA limited the amount of land a Village Corporation located within Wildlife Refuges, including Kaktovik Village (or in PET-4) may select with a Refuge to 69,120 acres even though the Village may otherwise be entitled to more land. Section 12(a)(1) also provided that Regional Corporations may not select the subsurface estate of Village lands located within a Wildlife Refuge or in PET-4. Instead, "in lieu" selections must be made from available lands outside the Refuge or the PET-4 area, no matter how far away.

1972 Arctic Slope Regional Corporation (ASRC) and Kaktovik Inupiat Corporation (KIC) are formed by North Slope Eskimo leaders. Kaktovik Village is located within ANWR, near the coastal plain area and on the Beaufort Sea.

North Slope Borough (county government for all of the North Slope) is formed under State law; Kaktovik Village is incorporated as a municipality.

1973 Arab Oil Embargo is imposed in October; oil embargo is followed by gas lines, major price increases and regional shortages of refined petroleum products.

Trans-Alaska Oil Pipeline Authorization Act adopted on November 16; legislation needed because of litigation and controversy over potential impact of pipeline on caribou; Vice President's vote breaks a 49 to 49 tie in the Senate.

Emergency Petroleum Allocation Act of 1973 adopted on November 27; provides legislative authority to deal with petroleum shortages and major price increases imposed by OPEC cartel by allocating and controlling prices of both crude oil and petroleum products.

In response to Section 17(d)(2) of ANCSA, on December 27 Secretary of the Interior recommends 83 million acres of lands in Alaska to the Congress for inclusion in Conservation System Units; Congress has five years to act on the Secretary's recommendations.

1975 "Haul Road" providing over-land access to Prudhoe Bay, and parallelling the pipeline route, is completed; roadway to revert to state ownership when North Slope production ends.

1976 Congress enacts Federal Land Policy and Management Act of 1976 (FLPMA) in major rewrite of public land laws.

1977 Trans-Alaska Pipeline goes into operation on June 20, moving North Slope crude oil to terminal at Valdez; first oil reaches Valdez on July 28th, 38 days later.

1978 Congress adjourns without enacting legislation to address D-2 Lands issue.

In November Secretary Andrus withdraws 110 million acres of public lands in Alaska pursuant to FLPMA.

On December 1, President Carter issues Presidential proclamations to establish 17 new National Monuments containing 56 million acres.

1980 U.S. Geological Survey "open file" report estimates that ANWR's coastal plain could contain as much as 17 billion barrels of crude oil and 34 tcf of natural gas in place, making this an area of Persian Gulf class oil and gas potential.

Alaska National Interest Lands Conservation Act of 1980 (ANILCA) is enacted; ANILCA represents response of Congress to withdrawals and recommendations made under Section 17(d)(2) of ANCSA and subsequent withdrawals and Presidential Proclamations.

ANILCA doubles the size of ANWR to 19 million acres; designates 8 million acres of the Refuge as Wilderness; Section 1003 prohibits production of oil and gas from ANWR or other leasing or development leading to production within ANWR until authorized by Act of Congress; and Section 1002 mandates Department of the Interior to undertake study and report to the Congress on both the oil and gas potential and the fish and wildlife values of the coastal plain area and permits carefully regulated seismic survey of the coastal plain's oil and gas potential.

Section 1431(g) of ANILCA permits Kaktovik Village (and Villages within PET-4 or NPR-A) to acquire, by exchange of lands they were required to select 85 miles away from the Village, an additional 23,040 acres (one township) of surface estate within ANWR adjacent and compact to the Village; Section 1431(o) provides ASRC with an option to acquire, through an equal land exchange, subsurface estate beneath Kaktovik Village's surface lands within ANWR. Both provisions are predicated on oil and gas exploration and development being authorized within the coastal plain.

National Petroleum Reserve-Alaska (formerly PET 4) a 23 million acre area in the Central Arctic, opened to competitive oil and gas leasing; royalty is to be split 50-50 with the State of Alaska, providing an exception to Section 28 of the Statehood Act. ASRC and NPR-A Villages exercise Section 1431 ANILCA options.

1981 Kuparuk field, the second largest producing oil field in the United States, located west of the Prudhoe Bay field, begins production.

1983 On August 9, ASRC and Department of the Interior conclude agreement pursuant to Section 1302(h) of ANILCA whereby ASRC grants to the Department 101,000 acres of surface estate in-holdings located within Gates of the Arctic National Park in exchange for 92,160 acres of subsurface estate located beneath the surface of lands owned by the Kaktovik Village Corporation within ANWR and within and adjacent to the coastal plain. This exchange and other land consolidations within other North Slope Villages located within NPR-A result in North Slope Village lands receiving same treatment as other Native Villages in Alaska.

1984 Group of 22 oil companies elect to participate in two-year $40 million seismic survey of coastal plain study area as authorized by Section 1002 of ANILCA.

Approximately 600 line miles of seismic and geophysical data acquired in ANWR coastal plain, pursuant to ANILCA Section 1002.

1984-85 Drilling of an exploratory well, KIC No. 1, began on Native lands of the Kaktovik Inupiat Corporation about 14 miles east of Kaktovik Village and north of coastal plain area; drilling completed in April 1986 at 15,193 feet.

An additional 580 line miles of seismic and geophysical data acquired in ANWR coastal plain through seismic survey pursuant to Section 1002 of ANILCA.

1985 Negotiations initiated between Department of the Interior and some Regional and Village Corporations and the State of Alaska to enable Department to acquire inholdings and to consolidate Federal Conservation System Units through exchanges of Native owned lands for oil and gas mineral interests in some of the Federal lands located in ANWR's coastal plain study area.

Milne Point oil field, north of the Kuparuk oil field, begins production.

1986 On June 3 Congressman Udall introduces H.R. 4922, a bill to designate the 1.5 million acre coastal plain of ANWR as a Wilderness area and to foreclose oil and gas exploration and development.

In response, Arctic Slope Regional Corporation (ASRC) takes the lead in forming broad based "Coalition for American Energy Security" to better inform the American public and the Congress of (1) the Eskimo peoples desire to develop their private lands within ANWR, and (2) the importance of the oil and gas resources of the coastal plain study area to national security, domestic energy policy, foreign policy and national economic well-being.

In August ASRC prepares and distributes report entitled The Arctic National Wildlife Refuge -- Its People, Wildlife Resources, and Oil and Gas Potential. Report sets forth views of ASRC and its 3,700 Eskimo shareholders on the need to secure Congressional permission to develop both ASRC's 92,160 acres of Kaktovik lands and the 1.5 million coastal plain area set aside by Congress for study in 1980.

On November 24 the Department of the Interior releases Draft Resource Assessment and Legislative Environmental Impact Statement (LEIS) on coastal plain of ANWR. Draft report discloses that coastal plain contains seven distinct plays with 26 separate major oil and gas prospects. These prospects are projected to contain from 4.8 to 29.4 billion barrels of oil with an average or mean estimate of 13.8 billion barrels in place. Estimate of "recoverable" reserves ranges from 600 million barrels to 9.2 billion barrels with an average or mean estimate of 3.2 billion barrels. Draft report recommends full, but staged, leasing of coastal plain for oil and gas exploration and development, with caribou calving areas in the southern Jago River area to be leased last.

Lisburne oil field on the North Slope begins production.

1987 Public hearings held in early January in Kaktovik, Anchorage and Washington, D.C. on Department of the Interior's Draft Report and LEIS.

On January 6 Congressman Udall introduces H.R. 39, a bill to designate the 1.5 million acre coastal plain as a Wilderness area.

State of Alaska releases geophysical report on coastal plain which contains similar, but slightly more modest projections than those compiled by the Department of the Interior on the coastal plain's oil and gas potential.

On February 2, Oil & Gas Journal article on coastal plain, notes "unconfirmed reports of good oil shows" in Kaktovik exploratory well, and quotes industry officials on "enormous potential" of coastal plain study area and potential "opportunity of participating in some billion barrel oil fields".

On February 11 Congressman Young introduces H.R. 1082, a bill to authorize competitive leasing, exploration and development of the oil and gas resources of the coastal plain in a manner consistent with protection of the area's environment, fish and wildlife resources and the needs of subsistence users.

On February 24 the National Petroleum Council, transmits report to the Secretary of Energy on Factors Affecting U.S. Oil & Gas Outlook. Report concludes that crude oil imports could rise from 27 percent in 1985 to 50 percent by 1990 and to 60 percent by 1995.

State of Alaska schedules lease sale in June 1987 for Camden Bay in State waters immediately north of and directly adjacent to the coastal plain.

On March 5 the 5 billionth barrel of crude oil is produced from the 600 development wells on the Prudhoe Bay reservoir.

National Wildlife Federation releases report on March 12 calling for a two-year national commission to further study the coastal plain. Report includes independent geologic study by Tom Marshall, former Alaska State Geologist who was instrumental in State's selection of Prudhoe Bay lands. Marshall's report concludes that Interior Departments study is very professional, but also very conservative in its oil and gas projections; and that coastal plain's hydrocarbon resource greatly exceeds the projections previously made by the Interior Department and the State of Alaska.

On April 20 the Department of the Interior releases final report and LEIS on Coastal Plain Resource Assessment. Secretary of Interior recommends full leasing alternative for coastal plain study area to the Congress.

In June the tenth year of operation of the Trans-Alaska Pipeline is observed in ceremonies in Alaska.

On May 15, S. 1217, a bill to authorize oil and gas leasing on the coastal plain, subject to proper environmental regulations and stipulations, is introduced by Senators Murkowski and Stevens.

On July 23, Department of the Interior announces agreement has been reached on terms to govern a major land exchange between six Native entities and the Department. Native entities would exchange 891,000 acres of Wildlife Refuge inholdings in Alaska for oil and gas interests in 166,000 acres of coastal plain. Department states land exchange will be subject to Congressional review and consummation will require express Congressional approval by Act of Congress.

On August 3, the House of Representatives passes H.R. 2629, a bill to deal with legal questions and uncertainties concerning submerged lands in Alaska. Title II of bill contains the Bradley-Miller amendment to require that any land exchanges or conveyances within the coastal plain study area are approved by prior Act of Congress.

Appendix II

Additional Material Submitted for the Record

STEVE COWPER
GOVERNOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

November 10, 1987

SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES
RECEIVED
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WASHINGTON D C 20510

The Honorable J. Bennett Johnston
Chairman
Senate Energy and Natural
  Resources Committee
364 Dirksen Senate Office Bldg.
Washington, D.C. 20510

Dear Mr. Chairman:

The State of Alaska appreciates this opportunity to respond to questions raised by the Senate Energy and Natural Resources Committee regarding the Arctic National Wildlife Refuge (ANWR). The state strongly supports the conclusion of the Final 1002 Report that oil and gas exploration be allowed in ANWR consistent with the chief purpose of the refuge to preserve its unique wildlife values.

Congress must set high standards for environmental protection in ANWR, and can take several actions to ensure that this occurs. A comprehensive and specific set of environmental protection standards should be developed and applied to oil and gas activities in the refuge to ensure protection of air and water quality and fish and wildlife resources. The purposes for which ANWR was established must be recognized in developing the appropriate standards.

STATE RECOMMENDATIONS REGARDING MITIGATION

The state recommends that Congress include provisions in the ANWR legislation which:

1. incorporate the mitigation measures contained in the Final 1002 Report, as amended by the suggestions in Enclosure A of this letter;
2. incorporate into legislation a clear standard requiring the proper degree of environmental protection in the refuge;
3. provide adequate protection of the wildlife resources of the refuge;
4. require an advance planning process for development to address such issues as the proper management of all waste streams (e.g., emissions of NO_x, industrial wastewater discharges, domestic wastewater discharges, drilling wastes,

oil wastes, sludges, hazardous wastes, scrap metal, and putrescrible wastes);

5. establish a process for interagency coordination in the development and refinement of detailed stipulations for all phases of oil and gas activities; and

6. require careful monitoring of compliance and environmental effects.

These recommendations are especially important given the lack of attention in the 1002 report to air and water quality and other environmental protection issues. The following is a more detailed discussion of these specific recommendations.

Incorporate Final 1002 Mitigation Measures into Legislation

The state provided recommendations to the Department of the Interior (DOI) in a letter from Robert Grogan, Director, Division of Governmental Coordination, to Robert Gilmore, Regional Director, U.S. Fish and Wildlife Service (USFWS), on February 6, 1987, regarding mitigation measures that should be included in the Final 1002 Report. The DOI has already addressed some of the state's comments on the draft mitigation measures. At your request, the state has evaluated the mitigation measures contained in the final report and provided our observations in Enclosure A. The state is reiterating those comments which were not addressed in the final report and suggesting specific language for some stipulations which would resolve our concerns.

The State of Alaska supports inclusion in legislation of the mitigation measures contained in the Final 1002 Report, with the language changes recommended in Enclosure A. While this does not represent a comprehensive mitigation package for ANWR exploration and development, it does provide a basic structure for the issues that need to be addressed. Legislation must also provide a strong environmental standard and process, as outlined in our comments below, that will allow for subsequent development of detailed stipulations to address additional environmental quality issues. The state recommends that the ability to modify or add to the stipulations be provided for in legislation. This will provide the necessary flexibility to modify the stipulations, as necessary, to reflect changes in technology, results of further research, or regulatory or statutory changes. Any changes to the legislated stipulations should be made only with concurrence of the State of Alaska, and with ample opportunities for public notice and comment. This is especially important to the villages of Kaktovik, Nuiqsut, and Arctic Village since they rely heavily on the resources of the refuge for subsistence. A role for Congress may also be appropriate.

Develop Standards for Environmental Protection

Legislation should require that a comprehensive and specific set of environmental standards be developed and applied to oil and gas activity in the refuge to ensure protection of air and water quality and fish and wildlife resources and uses. The mitigation measures contained in the Final 1002 Report do not address the full range of environmental quality issues in ANWR. The following issues of major importance have not been addressed:

(1) Air Quality Management
(2) Solid Waste Management
(3) Liquid Waste Management
(4) Hazardous Waste Management
(5) Oil Spill Prevention and Response

Development of clear standards to address these and other environmental quality considerations will require substantial additional effort, since little attention was formally paid to these issues in the Final 1002 Report. Legislation should require that specific mitigation measures be developed to address these issues. Legislation should also provide a role for environmental regulatory agencies in developing and interpreting these measures to ensure that appropriate technical expertise is available.

The mitigation measures which are developed must be based on a careful and critical evaluation of the experience and information gained regarding North Slope development. Key areas where improvements need to be considered include the management and disposal of drilling wastes, solid waste, hazardous wastes, oil waste, material site development and rehabilitation, cross drainage and fish passage, causeways, and produced fluids and gas.

Provide for Wildlife Protection

The State of Alaska recommends that Congress defer for ten years oil and gas leasing in the "core" caribou calving area (242,000 acres) described by the USFWS in the Draft 1002 Report. During this period, a seven-year research program should be undertaken to improve understanding of the importance of this core calving area, to assess the effects that oil development may have on use of the area, and to develop appropriate mitigation measures. The objective of this approach is to ensure the viability of the Porcupine Caribou Herd. There may be other ways to achieve this objective, and the state remains open to other options which would foster exploration and development of the oil and gas potential of the coastal plain while protecting the Porcupine Caribou Herd.

Require Pre-Development Planning

Legislation should require that explicit plans which address fish and wildlife protection and air and water quality issues be developed. For example, plans for management of major waste streams on an area-wide basis must be completed to ensure that proper state-of-the-art facilities are developed. In Enclosure A, the state has suggested language for a stipulation which would address pre-development planning.

Establish Coordinated Regulatory Process

Congress should mandate a formal, ongoing coordinated procedure involving the state and federal agencies, the North Slope Borough, and other parties to ensure that efforts to achieve environmental protection in ANWR are coordinated and comprehensive. The process would address design review, permitting, field surveillance, compliance and enforcement, and reclamation. Experiences associated with the development of the Trans-Alaska Pipeline System (TAPS) and the proposed Alaska Natural Gas Transportation System (ANGTS) could provide useful models for such a cooperative management program. The process should acknowledge existing regulatory requirements and authorizations.

Require Monitoring of Results

Legislation should require careful monitoring and study of environmental effects to ensure that development proceeds in a manner that meets a high standard of environmental protection.

STATE INVOLVEMENT IN "404" PROCESS

With regard to the permit program conducted by the U.S. Army Corps of Engineers, the state is involved in the permit process in three ways. The state has the authority to issue a certification on 404 permits through authority of the Clean Water Act, Section 401, and, in the coastal zone, through the federal Coastal Zone Management Act. The state also has authority to review applications for their potential impacts on fish and wildlife under the terms of the federal Fish and Wildlife Coordination Act. The state conducts a coordinated review of each application for its impacts on water quality, habitat and other resource issues. The 404 permit program is particularly important for regulating impacts to habitat due to placement of fill. Encouraging greater coordination between federal and state agencies in the existing 404 process would facilitate appropriate environmental protection, and would better serve project developers.

CONCLUSION

Recognizing the important renewable and nonrenewable resource values in ANWR, the state strongly supports the opening of the coastal plain to oil and gas leasing provided that a high standard of environmental protection is assured. The mitigation measures contained in the Final 1002 Report, with the modifications suggested by the state in Enclosure A, are the beginning of such assurances and should be incorporated into ANWR legislation. The state strongly urges Congress to also establish in legislation basic environmental standards and a process which will assure that issues not formally addressed in the Final 1002 Report will be addressed prior to development in ANWR. The state will review the developing ANWR legislation and looks forward to providing our comments on the manner in which these and other issues of state concern are addressed.

Thank you for requesting our views on those important matters.

Sincerely,

Eric Laschever for

Robert L. Grogan
Director
Division of Governmental
Coordination

Enclosure

ENCLOSURE A

State Comments on Stipulations Contained in the Final 1002 Report

General Comments: The State of Alaska provided the Department of Interior (DOI) with comments on mitigation measures contained in the Draft 1002 Report in a letter from Robert Grogan to Robert Gilmore, Regional Director, U.S. Fish and Wildlife Service, on February 6, 1987. The following comments reiterate state concerns not addressed by DOI in the Final 1002 Report.

First, there are mitigative measures for certain "non-evaluation" species mentioned in the species discussions in the Final 1002(h) report that are not contained in the section which summarizes required mitigation measures. These mitigative measures should be added to the summary section.

Second, there are a number of factors which are either not addressed or not handled in sufficient detail in order to provide for an overall effective mitigation program. Examples include the following: coordinated state/federal process for design review, permitting, field surveillance, compliance, and enforcement; rehabilitation; maintenance of public fish and wildlife resource use; material exploration, extraction, and rehabilitation; solid waste management; timing restrictions on activities, and setbacks required for the use of explosives; liquid waste management; hazardous waste management; stream crossings and fish passage; water management; bonding and financial responsibility; right of access; erosion control; oil spill contingency planning; penalty provisions for non-compliance; definitions of key terms; identification of information needs; design criteria and compliance plans; quality assurance/quality control; air quality; and support service industries. These subjects need to be addressed in a comprehensive manner and appropriate mitigative measures designed.

Third, the DOI stipulations do not clearly differentiate between stipulations or restrictions applied to exploration versus development. The state suggests that the DOI reorganize the entire mitigation summary section into two distinct components: exploration and development. Implementation of the stipulations should be tied to the type of activity proposed. For example, stipulations referring to area specific closures may be effective forms of mitigation during exploratory activities but may be ineffective or inappropriate during development. The DOI has not taken this step in the final report to clarify how and when the stipulations will be used and implemented.

Fourth, the term "unnecessary adverse effect," which is used in the Final 1002 Report, is not defined and does not appear in the U.S. Fish and Wildlife Service Mitigation Policy (Federal Register, vol. 46, no. 15). Adding further to the confusion is a list of "unavoidable effects" on page 144 and 145 that includes a mix of those effects that are truly unavoidable (e.g., loss of habitat by gravel overlay for roads and pads) with many that are avoidable with proper design (e.g., moderate loss of Arctic grayling habitat, use of limited natural fresh-water sources for industrial uses). Reference is made on page 109 of the Final 1002 Report to the fact that U.S. Fish and Wildlife Service will utilize their mitigation policy to guide their input regarding permit actions. In the same paragraph, DOI again refers to taking actions to ensure that "no unnecessary adverse effects" occur. It is still unclear as to what standard will be used to evaluate individual or cumulative project actions. In addition, consideration must be given to the State of Alaska's Coastal Management Program and the North Slope Borough's Coastal Plan that has been approved by the state. In particular, reference is made to the Habitat Standard (6 AAC 80.130) which requires habitats to be managed so as to maintain or enhance their characteristics, and that uses and activities which will not conform to this standard may be allowed if there is a significant public need and there is no feasible and prudent alternative to meet the public need.

Finally, DOI should include a stipulation which would require the development of comprehensive plans and programs. Suggested wording for this stipulation follows:

"Lessee shall submit design criteria to the state and federal government. It shall also submit comprehensive plans and/or programs (including schedules where appropriate) which shall include but not be limited to the following:

(a) Air quality and noise;
(b) Blasting;
(c) Camps;
(d) Clearing;
(e) Cultural resource preservation;
(f) Environmental briefings;
(g) Erosion and sedimentation control;
(h) Liquid waste management;
(i) Material exploration and extraction;
(j) Oil and hazardous substances control, cleanup and disposal;
(k) Overburden and excess material disposal;
(l) Pesticides, herbicides, chemicals;
(m) Quality assurance/quality control;
(n) Restoration;
(o) River training structures;
(p) Solid waste management;
(q) Stream, river and floodplain crossings;
(r) Surveillance and maintenance;
(s) Visual resources;
(t) Wetland Construction;
(u) Human carnivore interaction;
(v) Snow/ice roads; and

(w) Subsistence use protection.

These plans and programs may be combined as appropriate. The state and federal government shall approve the scope, content and schedule for submission of the requested plans and programs. The design criteria, including the plans and programs specified in this stipulation shall be approved in writing and shall be complied with by the lessee. Additional or supplementary plans may be required in the event that the plans submitted in accordance with this stipulation do not provide the detailed and/or site-specific data required to support the final project designs or to guide the conduct of the construction, operation, maintenance and termination of project actions."

Specific Comments: Our specific comments on each stipulation as presented in the Final 1002 Report follows. Specific wording for some of the stipulations is recommended and underlined.

Stipulation #1 - The state provided comment on this stipulation, but no changes were made by the DOI. While we agree in principle with this stipulation, as written it is too restrictive. Exploration includes both surface disturbing and non-surface disturbing activities. The stipulation should limit any surface disturbance activities to the winter months and allow only non surface disturbing activities during the summer, provided there are no area or timing restrictions that would dictate otherwise. Suggested wording for this stipulation follows:

> "Limit surface disturbing activities to November 1 - May 1 (exact dates to be determined by Refuge Manager). Cease surface disturbing activities and remove or store equipment at an approved site by May 15. Local exceptions may be made."

Stipulation #2 - The state provided comment on this stipulation and changes were made. However, as currently written this stipulation would be less effective in assuring adequate protection to caribou of the Porcupine Caribou and Central Arctic Caribou herds. It remains unclear how this stipulation would be enforced, and no definition has been provided for the term "nonessential facilities."

Suggested wording for this stipulation follows:

> "Consolidate, site, construct, and maintain facilities and pipelines to minimize effects on sensitive fish and wildlife habitats and species. Locate nonessential facilities outside caribou calving areas. Nonessential facilities are those facilities which are not directly required for the extraction or transportation of oil or gas - e.g., camps, airports, solid waste disposal sites; and roads, pipelines, and drill pads that can be feasibly located out of the

sensitive fish and wildlife habitats. Facilities that are proposed as essential should be evaluated on a case by case basis according to the following criteria: (1) there is no feasible engineering alternative; or (2) the environmental effects of placing a facility within the restricted zone would be less adverse than those of placing the facility outside of the zone."

Stipulation #3 - The state provided comment on this stipulation, but no changes were made by the DOI. Recommended wording for this stipulation follows:

"Roads and other facilities should be designed, constructed, and maintained in such a manner that the following performance standards are achieved: natural drainage is maintained; free passage of fish is provided; gravel fills are stable; upslope ponding and downslope dewatering is prevented; the number of stream crossings is minimized; natural floodplains and flow patterns are maintained; spring areas are avoided; and road alignments are perpendicular to stream flows and sited in areas of minimal floodplain width. Design criteria and specifications to satisfy these performance standards should be developed by the industry and should be approved by the appropriate federal and state agencies."

Stipulation #4 - We support this stipulation; however, the intent of the stipulation to minimize gravel use should be made explicit.

Stipulation #5 - The state provided comment on this stipulation and although some changes were made by DOI, our comments remain valid. We recommend that DOI address gravel removal and water removal separately. Suggested wording for the stipulation regarding water removal follows:

"During winter, water removal from fish-bearing waters (e.g., lakes, springs, streams, etc.) is prohibited. During spring, summer, or fall (i.e., the open water season), water removal will be restricted to those operations that will maintain instream flows at levels necessary to provide free fish passage and adequate rearing habitat, and will maintain water quality."

Suggested wording for the stipulation regarding gravel removal follows:

"Gravel removal from spring water areas and spawning areas of fall-spawning fish species is prohibited. Gravel removal from other fish-bearing waterbodies is prohibited unless authorized on a site-specific basis. In cases where floodplain gravel removal is authorized, the gravel site must be sited and designed to conform to the guidelines as defined in the Gravel Removal Guidelines Manual for Arctic and Subarctic Floodplains (USFWS, Woodward-Clyde Consultants, 1980). Plans for gravel removal shall incorporate detailed plans for rehabilitation and rehabilitation will be conducted in phases concurrent with the gravel removal operation. Consideration shall be given to the flooding of gravel pits and the use of water to support industrial activities provided that such water use is consistent with fish and wildlife uses of the site."

Stipulation #6 and #7 - The state provided comment on these stipulations, some changes were made; however, our original set of comments remain valid. Suggested wording for a stipulation covering big game passage follows:

"Facilities shall be sited, designed, constructed, and maintained in such a manner that free passage of big game animals is provided. Provisions to be considered for providing for free passage of big game animals include but are not limited to the following:

(a) bury pipelines where feasible and prudent;
(b) elevate pipelines to allow free passage in areas without buried sections or ramps;
(c) provide ramps over pipelines in situations where ramps are necessary to provide free passage (e.g., where development tends to funnel animals such as major road/pipeline intersections);
(d) separate roads and pipelines at the optimum distance for providing free passage, based on current research;
(e) prepare and implement a surface traffic control plan subject to the approval by the federal government with concurrence from the appropriate representative of the State of Alaska. The plan should consider such provisions as convoying, pulsed traffic, and seasonal or daily restrictions."

Stipulation #8 - The state's comments on this stipulation were not incorporated by DOI. A strict interpretation of the stipulation as currently written would prohibit the installation of gravel filled causeways. The following recommended language would allow for gravel filled causeways provided adequate breaching was incorporated into the design of the structure.

Suggested rewording of this stipulation follows:

"Site, design, construct, and maintain docks and causeways such that free passage of fishes is assured and changes in water quality (e.g., salinity, temperature, suspended solids, flow patterns) are minimized. The objective of minimizing water quality changes would be to ensure no net loss of warm, low salinity nearshore habitat that is preferred by anadromous whitefish species."

Stipulation #9 - The state supported the stipulation as proposed in the draft report. The rewording included in the final report is acceptable provided the first two concepts are separated into two sentences. Our recommended wording for this stipulation follows:

"Avoid construction in coastal areas near river systems with topographic relief or bluffs. Minimize activities along the coast through the polar bear denning period, approximately mid-March. Minimize activities along the coast during late October-early November when polar bears come ashore to den."

Stipulation #10 - The state provided comment on this stipulation and the DOI final report reflects in part the state's input. However, the stipulation as written is still too stringent. Provisions must be made to allow for the placement of certain facilities (e.g., drill pads) within the buffer zone and criteria for defining what constitutes "essential facilities" need to be developed (comments made on stipulation #2 regarding the definition of essential facilities and criteria for site selection in restricted areas are directly applicable to this stipulation).

In addition, Stipulation #10 must ensure free passage of caribou along the coast. This is the area where large aggregations of animals (20 to 80 thousand) occur and move along the coast of the 1002 area.

Stipulation #11 - We support this stipulation as written.

Stipulation #12 - The state provided comment on this stipulation and the DOI final report reflects, in part, the state's input. However, we still have the following recommendation on this stipulation. It is not known how widespread the distribution of Thaspi arcticum is, so it is impossible to determine where surface occupancy should be limited. DOI should further evaluate the species and define its distribution, or should delete this stipulation.

Stipulation #13 - We support this stipulation as written. Changes were made by DOI that incorporated input made by the state.

Stipulation #14 - We support this stipulation as written.

Stipulation #15 - The state provided comment on this stipulation; however no change was made by DOI. This stipulation should be modified to prohibit off-road vehicle use, except for travel by snowmobiles, unless otherwise specifically approved.

Stipulation #16 - We support this stipulation as written. Changes were made by DOI that incorporated input made by the state.

Stipulation #17 - We support this stipulation as written.

Stipulations #18 and #25 - The state provided comment on these stipulations and one small change was made by the DOI in the final 1002 report. However, our major concerns with these stipulations remain.

These proposed stipulations represent a very small step toward defining what will be needed to provide an appropriate level of air and water quality protection in ANWR as leasing moves forward. Further consultation between the DOI and the state is needed on this subject to jointly develop a workable package of specific measures. Such a process would better acquaint DOI with the extensive body of environmental regulation and provide appropriate forums for decisions about stipulations, plans of operation, and permits. It is crucial to ensure that exploration and development is conducted in accordance with environmental standards appropriate for the coastal plain of the ANWR.

Stipulation #19 - The state provided comment on this stipulation and no changes were made by the DOI. The blanket 3/4-mile buffer for all permanent facilities is too stringent as written. Provisions must be made to allow essential facilities (definition and criteria provided in our comments on Stipulation #2) within this 3/4-mile buffer.

Stipulations #20, #21, and #22 - The state provided comment on these stipulations, and no changes were made by the DOI. The state concurs with the need for special protection for the peregrine falcon. However, the stipulations should be modified to incorporate language developed by the federal falcon recovery team. In addition, the same level of protection provided to the endangered peregrine falcon should not be provide to all raptors.

Stipulation #23 - The state provided comment on this stipulation and changes made by the DOI only weakened the intent of this stipulation. We reiterate our recommendation. This stipulation should be worded as follows:

"Establish no-activity zone of at least 1/2 mile around any confirmed polar bear den. Track radio-collared female polar bears to determine den locations and implement an annual fall monitoring program to follow bears moving ashore and identify den site locations."

Stipulation #24 - The state provided comment on this stipulation and changes were made by the DOI which provide a higher degree of protection to subsistence uses. However, as worded, this stipulation does not take into consideration the factors of human safety and oil field operations. In addition, in order to implement this stipulation a thorough knowledge of subsistence use patterns is required. Suggested rewording for this stipulation follows:

"Close area within 5 miles of development and associated infrastructure to hunting, trapping, and discharge of firearms, except for subsistence uses only, on a site-specific basis, where there will be major effects on those uses. Where hunting may adversely affect wildlife use of the habitat around oil and gas infrastructure or where hunting may affect oil field operations and human safety, such hunting may be restricted. In order to implement this stipulation, baseline studies on subsistence use patterns will be required."

Stipulation #26 - The state provided comment on this stipulation and no changes were made by the DOI. Suggested wording for two stipulations to address this issue follow:

"The DOI is responsible for ensuring appropriate monitoring of populations, productivity, movements, and general health of key species (e.g., caribou, arctic char, polar bears, snow geese, muskoxen) in relation to overall oil and gas activities in ANWR."

"Lessees and permittees may be required to monitor the impacts of the activity on selected species, their habitats, and human uses; to evaluate impact hypotheses and the effectiveness of specific mitigation measures employed; and to develop corrective actions, including improved mitigative techniques, as necessary."

Stipulation #27 - The state supported the original language as contained in the draft 1002 report; however, DOI changed this stipulation by deleting the last phrase "and adequate staffing for full and effective enforcement of mitigation." We reiterate our comments, the original wording for this stipulation, at a minimum, should be retained. It is essential that provisions be made in the legislation which will ensure adequate funding to implement and enforce mitigation of impacts to fish and wildlife resources and the use of those resources.

Stipulation #28 - This stipulation was added by the DOI in the final 1002 report. We support this stipulation as presented in the final 1002 report and request the following wording be added: "The required plans should be developed and approved prior to implementing the project."

Stipulation #29 - The state provided input on this stipulation and one small change was made by the DOI. To fully address our concern, we suggest the following wording for this stipulation:

"Rehabilitation plans for all phases of oil and gas activities are required and must be submitted with any applications for permits to conduct ground disturbing activities. Research needs also exist and will require additional field work to fully define appropriate methods and means for the rehabilitation of specific project activities such as gravel pads, gravel roads, material sites, disposal sites, pipelines, etc."

Stipulations which were omitted in the Final 1002 Report

Stipulation #15 in the Draft 1002 Report was deleted. We believe that this stipulation should be added back into the final set of recommended mitigative measures. Wording for this stipulation is as follows: "Acquire authority to require aircraft to maintain 1,500 feet altitude above nest level within 1 mile horizontal distance of historic peregrine or other raptor nest sites April 15 - August 31 (June 1 if nest is unoccupied)."

Stipulation #26 in the Draft 1002 Report was deleted. We believe that this stipulation should be added back into the final set of recommended mitigative measures. Wording for this stipulation is as follows: "Acquire authority to establish time and area closures and minimum aircraft altitude of 2,000 feet above ground level (AGL) during muskox and caribou calving and caribou insect harassment, April 15 - August 15; and snow goose staging, August 20 - September 25. At other times the minimum altitude generally will be 1,000 feet AGL over areas of animal concentrations."

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November 17, 1987

Honorable J. Bennett Johnston
Chairman
Senate Committee on Energy and
Natural Resources
360 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

The Arctic Slope Regional Corporation ("ASRC") hereby supplements the Committee's hearing record by responding to written testimony submitted to the Committee on Energy and Natural Resources in connection with pending legislation to govern future oil and gas development in the Coastal Plain study area of the Arctic National Wildlife Refuge ("ANWR"). This testimony, together with draft statutory language, was submitted following the hearings on October 14, 15 and 16 in the name of three of the twelve resident Alaska Native Regional Corporations -- the Aleut Corporation ("Aleut Corporation"), Bristol Bay Native Corporation ("BBNC") and NANA Regional Corporation, Inc. ("NANA") (hereinafter referred to collectively as "Aleuts").

The testimony filed with the Committee by Aleuts is extremely misleading. The legislative amendment proposed by Aleuts in their testimony: (1) would interfere with ASRC's existing contract rights; (2) would dictate the outcome of pending arbitration proceedings filed against ASRC by Aleut Corporation and BBNC; and (3) could, if adopted, expose the United States to a substantial award for an unconstitutional taking of ASRC's vested property rights.

None of the impacts of the proposed legislative amendment were, however, disclosed in the filed testimony. Further, the background facts and law underlying this proposed amendment are not presented. As a result, the amendment presents a very misleading and deceptive record for action by any party not fully conversant with the background of this matter.

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Specifically, Aleuts have requested that Congress include in any legislation lifting the existing prohibition on development and production of oil and gas from ANWR a provision requiring ASRC to share any revenues it earns from its privately owned subsurface land holdings (mineral estate) within ANWR with all other Regional Corporations established under the Alaska Native Claims Settlement Act ("ANCSA") of 1971. ASRC acquired the lands in question, located near the Village of Kaktovik, by trading its largest, most valuable surface estate inholdings within the Gates of the Arctic National Park to the United States in an August 9, 1983 land exchange with the United States.

Aleuts assert that ASRC is refusing to share revenues from its Kaktovik lands in violation of Section 7(i) of ANCSA. The testimony that Aleuts have submitted in support of this amendment, however, fails to disclose to Members of the Committee that the revenue sharing relationship between ASRC and the other Regional Corporations is and has been governed by a court approved Settlement Agreement (the so-called "Section 7(i) Settlement Agreement," or "Settlement Agreement") signed in 1982 by all twelve resident Regional Corporations. Further, Aleuts' testimony makes no mention of Article II, Section 6(g) of the Settlement Agreement. This section specifically exempts exchanges of surface estate for subsurface estate from the Section 7(i) sharing requirement. Aleuts also withhold from the Members of the Committee the fact that the specific dispute which they propose to resolve by legislative fiat is the subject of both contested litigation pending before the Alaska Supreme Court and an arbitration proceeding currently before the American Arbitration Association. In fact, the arbitration proceeding was initiated by the Aleut Corporation and BBNC, two of the authors of the misleading and deceptive testimony.

Aleuts' testimony seriously misrepresents the facts of the land exchange between ASRC and the United States. Further, it seriously distorts the legal basis for the sharing obligations imposed by Section 7(i) of ANCSA and the 1982 Settlement Agreement. ASRC therefore requests that the following statement of the underlying facts and law be included in the record of hearings on S. 1217 and the future of the Coastal Plain study area and made available to Members of the Committee.

1. Aleuts Fail to Disclose to the Committee That the Matter on Which They Seek Legislation is Governed by an Agreement Approved by the Federal Courts.

The testimony submitted to the Committee by Aleuts does not disclose that the legislation they propose touches on matters governed by a contract in the form of a Settlement Agreement approved by the United States District Court for the District of Alaska. In 1982, after seven years of protracted and costly litigation, the twelve resident Alaska Native Regional Corporations entered into a 121 page Settlement Agreement. That Settlement Agreement defines, governs and implements every detail of the sharing obligations imposed upon the twelve signatory Regional Corporations by Section 7(i) of ANCSA.

Aleuts not only failed to mention this Agreement, they also failed to disclose to the Committee that Article II, Section 6(g) of the Settlement Agreement specifically exempts from Section 7(i) any revenues derived from subsurface estate acquired in an exchange for surface estate. Article II, Section 6(g) provides:

> If surface is traded for surface, or for subsurface, or for surface and subsurface, revenues from the property received in trade shall not be subject to sharing under this Agreement or Section 7(i).

ASRC structured the 1983 Kaktovik land exchange to fully comply with this contractual provision. Moreover, ASRC gave advance notice to Aleuts and all other Alaska Natives at a meeting of the Alaska Federation of Natives Lands Committee prior to consummating the exchange, informing them that the exchange would be in accordance with Article II, Section 6(g), on a surface-for-subsurface basis, without Section 7(i) sharing consequences. That meeting was attended by Aleuts' principals, Aleut Corporation, BBNC and NANA, none of whom objected at the time.

The attempt of Aleuts to invoke the aid of Congress, without fully disclosing the law or the facts, in their effort to force ASRC to share revenues received from the Kaktovik subsurface lands is nothing more than a transparent attempt to legislate away the court approved, contractual relationship between the Regional Corporations with respect to Section 7(i) sharing under ANCSA and the Settlement Agreement approved by the Court.

2. Aleuts Failed to Disclose to the Committee That Their Alleged Dispute With ASRC is the Subject of Both Pending Arbitration and Litigation.

The testimony submitted by Aleuts does not disclose that the legislation they propose would supersede and dictate the results of both pending arbitration proceedings and litigation. Article VI, Section 1 of the Settlement Agreement provides that "arbitration" -- not legislation -- "shall be the exclusive means of resolving" disputes arising under the Settlement Agreement. Pursuant to this provision, on September 26, 1986, Aleut Corporation and BBNC, together with a third Regional Corporation, Ahtna, Inc., initiated an arbitration proceeding that challenges ASRC's failure to share revenues received with respect to the

Kaktovik lands. A three member aribtration panel has been appointed to hear that dispute. Aleut Corporation v. Arctic Slope Regional Corporation, American Arbitration Association No. 75 113 0309 86.

ASRC filed suit in Alaska state court to enjoin the arbitration on the grounds that the claimants, having waited more than two years -- after learning that the 1983 land exchange had been structured under the Settlement Aqreement as a surface-for-subsurface exchange, exempt from Section 7(i) of ANCSA -- to file their demand for arbitration, are now barred by estoppel, waiver and laches. Although the trial court held that the issues raised by ASRC were to be decided by the arbitrators, not the court, the court has enjoined the arbitration pending appeal, and the matter is presently pending before the Alaska Supreme Court in Arctic Slope Regional Corporation v. The Aleut Corporation, et al. (Case No. 2310).

Unless Congress elects to intervene, therefore, the question of whether ASRC is required to share revenues earned with respect to its Kaktovik lands will be decided by the Alaska courts and/or the arbitration panel called into being by Aleut Corporation and BBNC. Heretofore, it has been the policy of Congress not to interfere in litigation between private parties, or to dictate the terms of settlement in matters pending before the courts. The Committee need look no further than the recently enacted Alaska National Interest Lands Conservation Act for examples of this long-standing and prudent policy. See, e.g., Section 901 (submerged lands chargeability), Section 905(e) (Native allotments), Section 906(n)(4) (Native trespass claims), Section 1431(n) (submerged lands ownership), and corresponding legislative history in Congressional Record S. 11782 (August 27, 1980, daily ed.), and Senate Report No. 96-413 at pages 287, 288 and 331 (96th Cong., 1st Session).

Considerations of fairness aside, the policy of non-intervention by the Congress in private disputes before the courts or arbitration panels is dictated by a sound policy of avoiding exposure of the United States to damages for taking the rights of the disfavored litigant. The Supreme Court's decision this past summer in Nollan v. California Coastal Commission, 55 U.S.L.W. 5145 (1987), strongly suggests that were Congress to limit or condition ASRC's right to develop its Kaktovik lands on an agreement by ASRC to give up valuable property rights in favor of Aleuts, the United States would be required under the Constitution to compensate ASRC for its losses.

3. Aleuts Fail to Disclose to the Committee That Other Regional Corporations, Including Aleut Corporation, Are Attempting to Exercise Their Right Under Article II, Section 6(q) to Exchange Surface Estate for Federal Subsurface in Exchanges Which Would Be Exempt from 7(i) Sharing.

In their testimony, Aleuts fail to disclose to the Committee that one of their number - Aleut Corporation - is presently negotiating with the United States to enter into a surface-for-subsurface land exchange with the United States that is structured to be exempt from Section 7(i) of ANCSA under the terms of the 1982 Settlement Agreement. What the Aleut Corporation is proposing for its lands is indistinguishable from the ASRC 1983 exchange that they are now attempting to amend with their legislative proposal. Involved in the consortium with Aleut Corporation in an effort to obtain Section 7(i) exempt ANWR subsurface lands are several other Regional Corporations and a number of Village Corporations. Also not disclosed is the fact that the Aleut Corporation plans to have their proposed "exempt" exchange included in S. 1217 or other Coastal Plain legislation. Aleut Corporation's participation in these negotiations demonstrates the general understanding that the exemption from Section 7(i) sharing for the lands obtained by ASRC in the Kaktovik exchange was authorized by the 1982 Settlement Agreement. It further underscores the fact that the position taken by Aleuts in the filed testimony -- for all its tone of moral condemnation -- is based not upon principle, but, apparently, upon corporate greed.[1]

4. Aleuts Have Seriously Misrepresented the Requirements of Section 7(i) of ANCSA.

Aleuts or their agents have intentionally mischaracterized the meaning and intent of Section 7(i) of ANCSA. They have represented to the Committee that "under Section 7(i), revenues from subsurface resources held by a Regional Corporation must be shared among all regions." They further state that Section 7(i) was designed to insure "that all Natives benefit in roughly equal proportions from the subsurface assets." This is a gross and deceptive misrepresentation of Section 7(i) of ANCSA.

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[1] The Aleut Corporation is currently lobbying S. 1009 (H.R. 1631) through Congress in an effort to obtain up to $18 million in federally appropriated funds as payment for lands, including subsurface, that Aleut was not allowed to select under the provisions of ANCSA. Although these funds are partially in lieu of ANCSA subsurface, Aleut has not proposed to share these funds with other Regional Corporations.

Section 7(i) of ANCSA does not require sharing of revenues from all subsurface owned by a Regional Corporation, regardless of how that subsurface is acquired. By its terms, Section 7(i) applies only to "revenues . . . from the . . . subsurface estate patented pursuant to" ANCSA. In other words, if subsurface is not acquired by a Regional Corporation as part of its ANCSA entitlement (or in exchange for other subsurface so acquired), sharing of subsurface revenues is not required by Section 7(i) of ANCSA.

If, for example, a Regional Corporation were to invest proceeds from business activities in the acquisition of Federal leases, revenue from those leases (clearly subsurface owned by the Regional Corporation) would not be subject to sharing. More to the point, Section 7(i) does not apply to any revenues derived from exploiting the surface estate. To illustrate the point, several Regional Corporations, including BBNC, own hotels in downtown Anchorage. The revenues from these businesses are not subject to Section 7(i) sharing, notwithstanding the considerable value that would have to be attributed to the surface estate ground leases.

When a Regional Corporation exchanges its Section 7(i) exempt surface estate for subsurface, the revenues from the subsurface acquired are no more subject to Section 7(i) sharing than if the Corporation were to purchase the subsurface with profits from its business activities. Article II, Section 6(g) of the Settlement Agreement was adopted by the signatory corporations (including the Aleuts) to reflect the legal requirements of Section 7(i) of ANCSA in this respect.

The fundamental premise behind the testimony submitted by Aleuts -- that ASRC is somehow evading Section 7(i) of ANCSA because it is refusing to share revenues received from subsurface owned by it -- is, therefore, incorrect and legally irrelevant. ASRC is not required to share revenues from the Kaktovik subsurface because this subsurface was "purchased" with an exempt asset, i.e., ASRC's valuable surface estate inholdings in the Gates of the Arctic National Park. ASRC's position is absolutely consistent with Section 7(i) and the letter and spirit of Article II, Section 6(g) of the Settlement Agreement signed by all the Regional Corporations, including Aleuts.

5. Aleuts Have Seriously Misled the Committee Regarding the Facts of the Kaktovik Exchange.

In previously submitted testimony on June 4, 1987 and on October 14, 1987, ASRC has provided the Committee with detailed information concerning the facts and background of the Katovik Exchange, including a detailed discussion, supplemented by an Appendix, of the legal authority for the land exchange.

Aleuts have represented to this Committee that ASRC acquired the Kaktovik subsurface by "accelerating" its ANILCA Section 1431(o) right to exchange subsurface conveyed to ASRC pursuant to Section 12(a)(1) of ANCSA in lieu of subsurface under Kaktovik Village selections originally denied to ASRC by that Section. Again, ASRC must assume that Aleuts or their agents have chosen to intentionally misrepresent the facts to the Committee.

Aleuts are fully aware of the terms of the Agreement between the United States and ASRC. The Agreement is a matter of public record and the subject of litigation between Aleut Corporation BBNC, and Ahtna, Inc. (a Regional Corporation that did not join in the filed testimony) and ASRC. That Agreement clearly recites that the exchange is made pursuant to the Secretary's authority to acquire lands within ANILCA conservation system units under Section 1302(h) of ANILCA and Section 22(f) of ANCSA, not under Section 1431(o) of ANILCA. The Agreement expressly preserves ASRC's ability to exercise its Section 1431(o) right in the event that the ANILCA Section 1302(h) exchange were for any reason to be rescinded or set aside. More importantly, neither ASRC nor the Secretary of the Interior had any legal authority to accelerate ASRC's Section 1431(o) rights. Those rights are contingent upon an opening of ANWR by Congress, which has not yet occurred. Indeed, S. 1217, the pending Coastal Plain legislation Aleuts seek to amend, is drafted to achieve this purpose.

Finally, had it been legally permissible for ASRC to accelerate the exercise of its Section 1431(o) right, ASRC would have been entitled to exchange to the United States virtually worthless "in lieu" subsurface acreage for the Kaktovik subsurface. Instead, ASRC exchanged 101,000 acres of its most valuable and highly sought-after (by the National Park Service) surface estate inholdings within the Gates of the Arctic National Park in order to acquire the Kaktovik subsurface at a time when it was legally impossible to exercise its ANILCA Section 1431(o) right.

In short, Aleuts' statement that ASRC acquired the Kaktovik subsurface by "accelerating" its Section 1431(o) right is, once again, flatly and, we believe, intentionally false.

Aleuts have also represented to this Committee that the Kaktovik Exchange violated a "traditional federal policy" of only exchanging the entire fee estate of property, rather than trading for surface rights. This is simply incorrect. The government's position (as understood by ASRC) has been that, while it prefers to acquire the entire estate, it is always willing to consider exchanges for split estates in appropriate circumstances. This policy was, in fact, well known to the Regional Corporations when they drafted the Section 7(i) Settlement Agreement, six full pages of which are devoted to the detailed consequences of exchanges involving split estates.

In 1984, ASRC exchanged the subsurface of its Gates of the Arctic National Park inholdings to the United States in a transaction authorized by the Congress in the Barrow Gas Field Transfer Act of 1984, Pub. L. 98-366. The fact that ASRC later exchanged this subsurface in a separate exchange is irrelevant, absent some showing that ASRC failed to receive and share the full and fair market value of that subsurface estate with the other Regions. This ASRC has done. Aleuts accepted ASRC's distribution checks under Section 7(i) of ANCSA -- and explanation -- without objection.

6. Aleuts Do Not Speak For the Alaska Native Regional Corporation or the Community of Alaska Natives.

Aleuts suggest that ASRC's land exchange is "intolerable for all Alaska Natives because of the threat to dismantle Section 7(i)."

When Alaska Natives speak to Congress as a body, they speak through the Alaska Federation of Natives. That organization has refused to become involved in the allegations advanced by the Aleuts. If past practice is a guide, however, the Aleut Corporation and BBNC made concerted efforts to enlist as many other Regional Corporations to their position as possible before coming to the Committee as a last resort. In fact, Aleuts represent but three of the twelve resident Regional Corporations.

All of the Regional Corporations entered into a Settlement Agreement in 1982 that expressly authorizes surface-for-subsurface exchanges such as the Kaktovik exchange, without Section 7(i) of ANCSA revenue sharing consequences. As ASRC has pointed out previously, a number of these corporations -- including the Aleut Corporation -- are actively engaged in negotiations with the United States for similar Section 7(i) of ANCSA exempt surface-for-subsurface exchanges. It is not ASRC that is attempting to "dismantle Section 7(i)." Rather, it is Aleuts who are attempting to dismantle the 1982 Section 7(i) Settlement Agreement by proposing legislation that subverts and is flatly inconsistent with the statutory and contractual sharing obligations of the Regional Corporations.

Any major revision to the Section 7(i) sharing relationship, such as that proposed by Aleuts, should be taken only if consensus can be reached among all corporations. It is important to note that under Article X of the Settlement Agreement the provisions of the Agreement may be amended only by unanimous consent of all twelve resident Regional Corporations. Article XI of the Settlement Agreement goes on to provide that the corporations will meet at two-year intervals to review the Agreement and consider modifications. The Aleut Corporation and BBNC boycotted the most recent attempt of the Regional Corporations to meet on Section 7(i) related matters.

Congress should be most reluctant to entertain efforts by only three of the Regional Corporations to adjust the delicate and carefully negotiated relationship among the Regional Corporations with respect to Section 7(i) revenue sharing.

Because ASRC believes that this Committee has no interest in legislating a resolution of its differences with Aleuts, it has confined its remarks to pointing out the omissions and misrepresentations contained in Aleuts' testimony. We have not attempted to "brief" the Committee on the details of that dispute and ASRC's position with respect to the same. We would, however, be pleased to provide the Committee with whatever additional materials or explanation the Committee may require in order to satisfy itself that ASRC's position in the pending arbitration and litigation proceedings is meritorious.

ASRC sincerely regrets that Aleuts, by failing to notify the Committee of the existence of the Section 7(i) Settlement Agreement and the pending litigation between two of their group and ASRC, have deflected the attention of the Committee from the merits of the debate regarding opening the Coastal Plain study area of ANWR. ASRC continues to support the Committee's efforts to give careful consideration to opening ANWR to limited exploration and development. ASRC trusts that the Committee will not be distracted by Aleuts' attempt to inject a tangential and largely irrelevant dispute between private parties into the larger debate on important national policy issues.

Very truly yours,

Jacob Adams

Jacob Adams, President

COMMENTS
of the
INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS

on
Oil and Gas Leasing
in the
Arctic National Wildlife Refuge

filed with the
United States Senate Energy and Natural Resources Committee

Washington, D.C.

Hearing Record of
October 22, 1987

This statement is submitted on behalf of the International Association of Drilling Contractors (IADC), a trade association representing virtually the entire worldwide contract drilling industry, most of which is headquartered in the United States.

IADC strongly supports the U.S. Department of the Interior's (DOI) proposed recommendation to Congress that the Arctic National Wildlife Refuge (ANWR) coastal plain should be opened to oil and gas leasing.

At a time of continuing political turmoil and terrorism in the Middle East, it is essential that the United States assign the highest priority to finding and developing additional oil and gas resources within its borders.

DOI's draft report estimates that there are billions of barrels of oil to be found under the ANWR coastal plain. DOI estimates that recoverable reserves range from 600 million to 9.2 billion barrels of oil, while in-place resources range from 4.8 billion to 29.4 billion barrels. The draft report states: "The area is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies."

Although there is uncertainty inherent in all oil and gas exploration methods which do not include actual drilling, the Interior Department estimates for the ANWR coastal plain a very large crude oil potential -- on the same order of magnitude as the nearby Prudhoe Bay field, the largest U.S. discovery to date. Crude oil from the North Slope's three producing oil fields -- Prudhoe Bay, Kuparuk, Lisburne, and Milne Point (which may soon be joined by oil from the Endicott field) -- are already contributing about 20 percent to U.S. oil production. The nation's dependency on foreign oil could increase markedly in the years ahead, as these fields -- along with older fields in the lower 48 states -- reach peak production and start to decline, as many already have. The U.S. must turn to Alaska's undiscovered oil and gas if our future energy supply is to be provided for.

If we therefore accept the fact that these resources will eventually be needed, the ANWR coastal plain development is particularly urgent at this time as an element to help stabilize economic conditions in the severely depressed U.S. petroleum industry and the drilling companies that support it. It is difficult to exaggerate the extent of the current depression in the petroleum industry and the oil producing states. Hundreds of thousands of workers have lost their jobs. Hundreds of drilling and service, equipment, and supply companies have either merged or gone bankrupt as the oil companies have been forced to drastically reduce their spending on exploration and production projects.

According to Baker-Hughes International, in Houston, Texas, the 1981 U.S. average number of rotary drilling rigs running was 3,969. The 1986 number was 964. The rig count the week of October 16, 1987 was 1,134.

The growing gap between domestic consumption and production has been filled by an increase in oil imports, which were up 23% in 1986 over the 1985 level. Oil imports for the first quarter, 1987 were up 27.4% over the same period in 1986. Recent import estimates run as high as 40% of U.S. oil consumption -- a higher level of dependence than at the time of the 1973-74 oil embargo. Furthermore, U.S. imports from the volatile Persian Gulf area have increased 300% in 1986 and accounted for more than half of the total increase in imports in 1986.

We believe our nation cannot afford to exclude the ANWR coastal plain from efforts to find and develop the domestic energy resources so urgently needed to meet our future needs. The alternative is continued and growing dependence on oil imports and increased risk of energy supply disruptions of the type experienced in the 1970's.

Oil from the coastal plain would be transported by onshore pipeline to the Trans-Alaska pipeline (TAPS). Experience from TAPS and the Prudhoe Bay, Milne Point and Kuparuk oil field development proves that pipelines can be designed, constructed and operated on the North Slope to allow passage of caribou and other wildlife.

ANWR is not a local issue. We believe that development of the ANWR coastal plain could result in significant economic benefits to all Americans. Revenue and activity generated by the increased exploration and development activity on the coastal plain would benefit not only the federal and Alaskan state governments, but the economy throughout the U.S., as equipment purchases are made and employment opportunities created, just as other operations in northern Alaska have done.

We believe America's energy security is at stake in the ANWR debate. If we are to reduce our heavy dependence on oil imports and provide our nation with a stable and dependable energy future, we must take steps now to increase domestic oil and gas production. We support DOI's draft report recommendation that the ANWR coastal plain be opened to oil and gas leasing.

STATEMENT OF
ERNEST J. CORRADO, PRESIDENT
AMERICAN INSTITUTE OF MERCHANT SHIPPING

BEFORE THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES

OCTOBER 22, 1987

The American Institute of Merchant Shipping (AIMS) appreciates the opportunity to submit this brief statement for the hearing record on legislation to allow oil and gas leasing within the Coastal Plain of the Arctic National Wildlife Refuge (ANWR). We particularly wish to express our appreciation to the committee members for proceeding with these important hearings.

The American Institute of Merchant Shipping (AIMS) is a national trade association representing 23 U.S.-flag shipping companies which own or operate approximately eight million deadweight tons of tankers, dry bulk carriers and other oceangoing vessels engaged in the domestic and international trades of the United States. As a representative of the vast majority of tankers involved in the carriage of crude oil from Alaska's North Slope (ANS), we strongly support S. 1217 to amend the Mineral Leasing Act of 1920 to authorize the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the public lands within the Coastal Plain of ANWR for oil and gas exploration, development, and production.

Presently, most of the crude oil tankers under the U.S.-flag are engaged in the transportation of ANS crude oil. This crude oil is produced from existing fields in Alaska's Prudhoe Bay Area, and delivered via the Trans Alaska Pipeline (TAPS), to Valdez Alaska, where it is loaded onto tankers and transported to the lower 48 states. U.S.-flag vessels must be used in this trade in accordance with the Jones Act which reserves domestic waterborne commerce for U.S. documented vessels. There are currently 65 tankers in the "TAPS" trade.

On behalf of American tanker owners, we are proud of the outstanding environmental record established by our ships in transporting Alaska North Slope (ANS) crude oil to markets on the mainland. We believe this record should be used in assessing the environmental impacts of the continued carriage of ANS crude and the carriage of ANWR oil when and if developed.

Set out below are some salient facts indicating the excellent safety and environmental record of petroleum transportation by U.S. tankers in the domestic trades.

- The Port and Tanker Safety Act of 1978 has been implemented, requiring segregated ballast tanks, crude oil washing systems and inert gas systems on all tankers over 20,000 DWT, as well as numerous other improvements.

- The reliability of shipboard equipment has been greatly improved in recent years with the advent of satellite-assisted navigation, improved radar, and redundant steering mechanisms.

- The implementation of MARPOL '78 insures that discharges at sea do not occur, and that adequate waste reception facilities are provided.

- In three years (1981-1983), one of our largest operators lifted 45 million barrels of crude by tanker from Santa Barbara Channel spilling only one gallon.

- In the first seven years that the Trans-Alaskan Pipeline System (TAPS) was opened, tankers moved over three billion barrels of crude oil out of Valdez. Approximately 200 barrels have been spilled, which is equivalent to 67 barrels per billion barrels of oil shipped and a large portion of the amount spilled was recovered. No adverse environmental impact has been noted.

- Tankers have been transiting Santa Barbara Channel for well over 80 years. To our knowledge, no significant spills involving permanent environmental damage have occurred.

- One large oil company reports no spills since the inception (in the mid 1970's) of lightering operations in the U.S. Gulf from large (VLCC or ULCC) tankers to small tankers. Over 600 lighterings have occurred; these operations are far more difficult than loading from a single anchor leg mooring (SALM).

At present, there are somewhat less than 10 million DWT of tankers active under the U.S. flag. About 70% of this total is employed in the distribution of ANS crude. These tankers form a vital part of the merchant marine which the U.S. can call upon in time of war or national emergency to carry petroleum products. Fortunately, the ANS crude market at this time is supporting these vessels and the manpower base necessary to run the ships.

However, as shown in the attached chart, when the production in the Prudhoe Bay oil fields declines, vessels will be forced out of this trade with little prospect of finding cargoes elsewhere. The vessels would be laid up and, unless there is a reasonable expectation of production in ANWR, most will be scrapped, which will result in an exacerbation of an already acute shortage of militarily useful tankers. We would add that lay up status does not guarantee that competent crews will be readily available if it becomes necessary to break the vessels out for an emergency. Approximately 50% of the tanker manpower base is found on the vessels transporting ANS crude. A commercial market which utilizes ships is the only guarantee that ships and men will be available when needed for the national defense. A continued use of the TAPS systems by directing any oil found on the coastal plain into TAPS is a logical, environmentally sound method to proceed. TAPS and tankers have provided a safe method of transporting ANS crude and their use should be continued.

Other supporters of a decision to open the Arctic National Wildlife Refuge coastal plain to exploratory drilling and hopeful eventual development of oil fields will refer to the positive aspects of replacing the 20% of present domestic oil production represented by the Prudhoe Bay oil. To the considerable extent that this adds to the national security of the U.S., we add the very consequential benefits of keeping the major portion of the U.S. tanker fleet at work and available. This fleet operation provides major economic and national defense benefits for the United States.

In addition, supporters will show that oil can be produced on the Coastal Plain in an environmentally sound manner. I had the opportunity to visit the North Slope of Alaska and ANWR this past summer. I was convinced, by observing the operations at Prudhoe Bay, that the technology available will ensure that no adverse effects to the ecology, environment, and wildlife will result from oil production within ANWR.

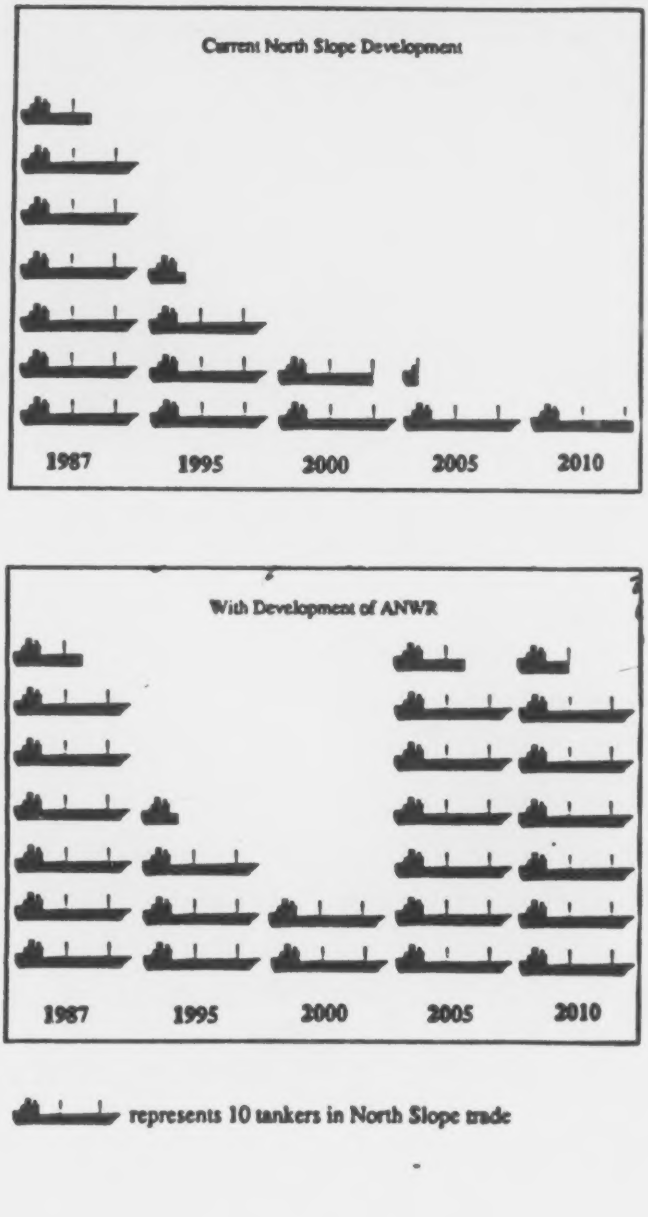
The alternative to the development of ANWR is really unacceptable because, among other things, it would result in the idling and subsequent destruction of the existing infrastructure (tankers, the Trans-Alaskan Pipeline, etc.). This would be an unjustifiable waste in any circumstance, but especially in these days of emphasis on conservation of resources and on U.S. productivity.

We appreciate this opportunity to comment for the record and strongly support opening the coastal plain, representing 1.5 million acres of the 19 million acre Arctic National Wildlife Refuge, to oil and gas development.

ATTACHMENT

CRUDE OIL TANKERS IN NORTH SLOPE TRADE

All tankers in North Slope Trade are U.S.-Flag Ships



14603 9th Ave S.W.
Seattle, WA., 98166
October 19, 1987

Honorable Bennett Johnston
Chairman Energy & Natural Recources Committee
U. S. Senate,
Washington, D. C., 20510

Dear Senator Johnston,
I would like to voice my opposition to the development and exploration of the 102 area of the Arctic National Wildlife Refuge, and further recommend that the costal plain west of the Aichillik River be given Wilderness protection.

I have visited the ANWR on three occasions; 2 weeks in the Lake Peters and Lake Sharader area hiking and climbing, 4 weeks in the Hula Hula River area, hiking and kayaking, and 6 weeks in the Canning River area hiking and kayaking down the river and along the coast to Barter Island. This area is a valuable natural resource, and deserves Wilderness protection and protection from oil and mineral development and exploration.

Please make this letter part of the hearing records. Thank you.

Yours truly,

Harry H Burlingame

Harry H. Burlingame

Charles Hamel and Associates

101 QUAY STREET
ALEXANDRIA, VIRGINIA 22314
TEL: 703-549-0615

October 28, 1987

The Honorable J. Bennett Johnston
Chairman
Committee on Energy and Natural Resources
United States Senate
Room #360, Dirksen Senate Office Building
Washington, D.C. 20510

SUBJECT: Written testimony submitted to be included in the Official Record of the Committee's current Hearings on the Development of the Arctic National Wildlife Refuge (ANWR)

Dear Mr. Chairman:

The following testimony is submitted for the Record of your current Hearings on proposed development of the ANWR. I requested permission to testify in person and continue to be available to discuss any of the following testimony with you.

I own minor interests in six North Slope oil leases and I have been actively engaged in the tanker transport of North Slope crude to the East Coast for a number of years. In 1985 I reported to the EPA numerous environmental permit violations which resulted in the issuance of EPA Compliance Orders upon the Trans Alaska Pipeline System (TAPS) Owners' operating company, ALYESKA.

Because of my expressed interests in the environment and employee safety, five ALYESKA employees sought me out in July, 1985. They were concerned for the Valdez environment, their personal safety and the integrity of the Pipeline Terminal itself. Each approached me separately and independently regarding the same questionable activities and do not have knowledge of each other's involvement to this day. They and others have since provided me compelling evidence of apparent misconduct by ALYESKA. On behalf of these employees, I bring to your attention today two of the most serious violations that relate directly to your current ANWR deliberations.

I am also familiar with this issue from the legislative perspective. While serving in the Senate in the early seventies as Executive Assistant to Senator Mike Gravel, I was involved in the formulation of a number of stipulations which resulted in the Final Environmental Impact Statement (EIS), embodied in the TAPS Authorization Act.

Your Committee is now reviewing a similar EIS on the adjoining ANWR and formulating with the industry representatives additional stipulations to satisfy your Committee's environmental concerns. You have heard extensive testimony on industry's record at Prudhoe Bay. I believe that my testimony is important to your deliberations since to date no witness has given evidence of industry's disregard for major, Arctic environmental stipulations obtained by your Committee in the past. I believe your Hearings are the appropriate forum to disclose this information to assure that the debate between the industry and the environmentally concerned includes all the relative facts.

During this Committee's 1973 proceedings on the TAPS the stipulations in the Final EIS clearly defined the obligation of the TAPS Owners to operate Vapor Recovery Systems (VRS) in conjunction with their crude tanks throughout the pipeline system as stated on Page 95, of Volume 4:

> "Pollutants emitted from oil storage tank vents as a result of hydrocarbon evaporation losses are to be recovered by a vapor recovery system ... Final design should insure that all storage tanks are included in the system. ALYESKA states that recovered vapors and condensed hydrocarbon liquids would be used as fuel ... Final design should insure maximum recovery and utilization of recovered vapors ..."

The Clean Air Act defines VRS as:

> "VAPOR RECOVERY SYSTEM means a vapor gathering system capable of collecting all hydrocarbon vapors and gases discharged from the storage vessel and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere".

The TAPS Owners initially fulfilled their obligations to you by installing and operating VRS facilities which required gigantic thermal oxidizers to totally incinerate the vapors' toxic compounds.

On March 3, 1983, EPA wrote to ALYESKA stating that the Agency did not believe it had jurisdiction over the Valdez Terminal VRS facilities. EPA, however, encouraged ALYESKA to maintain the system and warned that "The increased emissions that would occur if the vapor recovery system is shut down could degrade air quality in Valdez." In spite of EPA's recommendations ALYESKA proceeded to dismantle its VRS facilities throughout the TAPS, disregarding its environmental responsibilities and commitments to your Committee and the American public. In fact the thermal oxidizer at Prudhoe Bay thereafter served only as a navigational landmark for pilots until it was dismantled and carted off prior to your recent visit to the site.

In the less-isolated Valdez Terminal, Management dismantled the internal mechanisms and fuel supply of the three, ten-story-high, thermal oxidizers which converted the oxidizer chambers to perform as merely concealed flare systems. A seldom used, low capacity vapor line to the Terminal Power Plant was installed. This enabled ALYESKA to mislead the Government Agencies, visiting Government Delegations and the public into believing that much of the recovered vapors are used as fuel. In fact, since instituting these modifications, ALYESKA has been disposing of up to 90% of its enormous toxic tank vapor emissions into the Valdez and Prudhoe Bay environment.

Mr. Chairman, during the recent Prudhoe tour your Delegation viewed the ARCO Gasification Plant. By-products of that facility are Natural Gas Liquids (NGL's). Since last November, ARCO and SOHIO/BP have been blending into their crude stream up to 50,000 barrels daily of these NGL's for transport through the TAPS crude line. The TAPS crude tanks were not designed to contain the NGL's vapor boil-off and there exists no operable, effective vapor recovery systems associated with those tanks, compounding the emissions problem more than twofold. This means that massive, out-of-control, toxic "volatile organic compounds" are released daily from the Pump Station One site you visited and Valdez Terminal.

These violations are not easily discernable as evidenced by the official on-site briefings given unsuspecting Federal Agencies, as well as Congressional and news media delegations. The evidence provided me by company technicians comes from ALYESKA internal memorandums, documents, in-house publications and publicity brochures.

The Alaska Department of Environmental Conservation (ADEC) Regional Supervisor in Valdez, Mr. Dan Lawn, has been successfully monitoring EPA Compliance Orders on other Terminal Facilities and activities. Although he has not been involved in the VRS Facility operations, I suggest Mr. Lawn be requested by you to inspect the thermal oxidizers and review the operations log books to verify within 24 hours

Page Four

the accuracy of my testimony with regard to the Valdez activities.

I believe it is important for you and the American public to be aware of this unnecessary and regrettable degradation of the Arctic environment. I hope that this testimony I am presenting on behalf of present and former ALYESKA technicians can be of help to you and your Committee Members in formulating more meaningful and especially more effective stipulations for the protection of the Arctic National Wildlife Refuge and the Inupiat Villagers who reside in the region.

Thank you for the opportunity to present this information to your Committee.

Sincerely yours,

Charles Hamel

Charles Hamel

ATTACHMENTS:

ALYESKA letter to EPA, dated July 7, 1987
EPA letter to ALYESKA, dated March 3, 1983

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

DALE BUMPERS, ARKANSAS
WENDELL H. FORD, KENTUCKY
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JOHN MELCHER, MONTANA
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FRANK H. MURKOWSKI, ALASKA
DON NICKLES, OKLAHOMA
CHIC HECHT, NEVADA
DANIEL J. EVANS, WASHINGTON

DARYL H. OWEN, STAFF DIRECTOR
D. MICHAEL HARVEY, CHIEF COUNSEL
FRANK M. CUSHING, STAFF DIRECTOR FOR THE MINORITY
GARY G. ELLSWORTH, CHIEF COUNSEL FOR THE MINORITY

United States Senate

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510-6150

November 11, 1987

Mr. Dennis Kelso
Commissioner
Alaska Department of Environmental Conservation
P.O. Box O
Juneau, Alaska 99811

Dear Mr. Kelso:

Attached is a copy of testimony submitted by Mr. Charles Hamel regarding the Committee's current examination of proposals to open the Coastal Plain of the Arctic National Wildlife Refuge in Alaska to oil and gas leasing, exploration and development.

Mr. Hammel makes several serious allegations in this testimony regarding certain operational aspects of the Trans Alaska Pipeline System. His specific allegations relate to "enormous toxic tank vapor emmisions into the Valdez and Prudhoe Bay environment" as a result of non-existent or non-functional thermal oxidization equipment.

I would appreciate an expeditious and thorough examination of these charges by the appropriate personnel in your Department. I am interested in learning whether this problem does, in fact, exist. If it does, how serious is it; who is responsible; and what recommendations you would make for rectifying the situation.

Should you have any questions, please feel free to contact me or Tom Williams of the Committee staff at 224-7145.

Sincerely,

J Bennett Johnston

J. Bennett Johnston
Chairman

JBJ:dmn

STATE OF ALASKA
DEPT. OF ENVIRONMENTAL CONSERVATION
OFFICE OF THE COMMISSIONER
P.O. BOX O, JUNEAU, ALASKA 99811-1800

STEVE COWPER, GOVERNOR

(907) 465-2600

December 10, 1987

The Honorable J. Bennett Johnston
Chairman
Committee on Energy and Natural Resources
United States Senate
Room 360, Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

I have reviewed the testimony provided to you by Mr. Charles Hamel, dated October 28, 1987, expressing concerns about possible violation of air quality requirements at the Alyeska pipeline terminal and other pipeline facilities. Mr. Hamel indicates that Alyeska has not maintained adequate facilities to recover the vapors that are emitted at the various facilities along the pipeline and has in fact failed to operate the vapor recovery systems that do exist. Mr. Hamel characterizes this as demonstrating a disregard for the environment on the part of the industry. You have asked me to respond to these statements.

To determine whether the vapor recovery systems installed at the Alyeska terminal in Valdez are being operated properly, our staff visited the terminal facility on November 17. The staff did not find that any vapor recovery systems had been dismantled. In particular, Mr. Hamel's statement that, "management dismantled the internal mechanisms and fuel supply of the three, ten-story-high oxidizers which converted the oxidizer chambers to perform as merely concealed flare systems," does not appear to us to be correct. We will evaluate the maintenance and operation of the equipment at the facility and have more complete conclusions to present to you at that time.

The implications of the inclusion of natural gas liquids (NGL's) with the petroleum transported through the pipeline is of greater concern. Since the construction of the gasification plant at Prudhoe Bay, the industry has been blending up to 54,000 barrels per day of NGL's into the stream. The implications of this additional source of air emissions of hydrocarbons have not been thoroughly reviewed. It is possible that additional emissions exceed the threshold for regulation under the "Prevention of Significant Deterioration" (PSD) permit program authorized under the Clean Air Act and delegated to the state by the Environmental Protection Agency (EPA). An increase of 40 tons per year of hydrocarbons at any Alyeska facility or at any refinery drawing product from the pipeline would trigger a major source review, requiring a PSD permit for any affected facility.

We are looking into whether the PSD regulatory threshold has been reached. We have requested the necessary information and records from the Alyeska Pipeline Service Company and the two refineries that draw product from the line. The facilities potentially affected are the Valdez terminal of the pipeline, the twelve pump stations between Prudhoe Bay and Valdez, and the two refineries in Fairbanks. Of the pump stations, particular attention will be given to station one, where crude oil is introduced into the pipeline; and stations six, eight, and ten, which include small topping plants.

Collection and analysis of the necessary information to establish whether emissions are above the PSD threshold, additional assessment of control technology, and ambient air quality impacts would be the next steps. If any facility is found to violate PSD provisions, we have existing procedures and regulations to bring the violating source into compliance.

The immediate environmental significance of the hydrocarbon emissions outside the facility is unlikely to be acute, since hydrocarbon emissions are of greatest concern as precursors to ozone formation. With the climatic conditions in Alaska, ozone formation is not a problem. However, the emissions deserve and will receive serious and immediate scrutiny.

Mr. Hamel also includes allegations about whether Alyeska has adhered to the conditions and stipulations included in the final environmental impact statement (EIS) for the pipeline. It might be appropriate to request a view on this specific issue from the Bureau of Land Management, which is the federal agency charged with responsibility for implementing the stipulations of the EIS. Clean Air Act requirements for PSD did not apply at the time the pipeline was constructed. DEC did not have authority to oversee implementation of EIS stipulations.

I will provide you with the results of our efforts as they become available. Please feel free to contact me directly if you need any additional information.

Sincerely,

Dennis D. Kelso
Commissioner

Alyeska pipeline
SERVICE COMPANY

1835 SOUTH BRAGAW STREET, ANCHORAGE, ALASKA 99512, TELEPHONE (907) 278-1611, TELEX 090-25-127

July 7, 1987

Letter No. 87-4843-G

U.S. Evironmental Protection Agency
Alaska Operations Office
701 C Street
Box 19
Room E 551
Anchorage, AK 99501

Gentlemen:

The Alyeska Pipeline Service Company's vapor recovery system located at the Valdez Marine Terminal was shut down on the morning of July 5, 1987. The recovery system was shut down to allow the replacement of approximately 200 feet of high pressure vapor recovery pipe. The system will be put back into operation approximately July 19, 1987. We understand we are not obligated to notify you, however, we wanted you to be aware of the temporary shutdown.

If you have any questions, please give me a call at 265-8433.

Very truly yours,

Judith E. Brendel

Judith E. Brendel
Contingency Specialist

JEB/dhr

cc: ADEC-Anch
Arlan Kohl
Ed Barber

RECEIVED
JUL 16 1987
ENVIRONMENTAL CONSERVATION
SCRO

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

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Department of Environmental Conser.

Tony

RECEIVED 4/A
MAR 1 8 1983
ENVIRONMENTAL CONSERVATION
REGION II

REPLY TO
ATTN OF: M/S 532

MAR 3 1983

R. L. Mikkelsen
Environmental Coordinator
Alyeska Pipeline Service Company
1835 South Bragaw Street
Anchorage, Alaska 99512

Dear Mr. Mikkelsen:

I am writing in response to your letters of November 8, and December 20, 1982 (your number 82-3181-6) regarding shutdown and subsequent startup of the storage tank vapor recovery system at the Alyeska Valdez terminal. It has come to my attention that the standards which required the installation of that system (EPA's New Source Performance Standards for Petroleum Storage Vessels, 40 CFR, Part 60, Subpart K) are no longer considered enforceable by EPA.

EPA promulgated these standards in 1974 prior to the 1977 Clean Air Act Amendments. The standards are equipment standards, rather than standards which set emission limits. As such, EPA has determined that the effect of the Supreme Court decision in the Adamo case (434 US 275 (1978) is that EPA did not have the authority, prior to the 1977 Amendments, to promulgate equipment standards under Section 111 of the Clean Air act. These standards are therefore unenforceable. Subsequent standards for petroleum storage vessels (Subpart Ka) apply only when construction is commenced after May 18, 1978 and therefore do not apply to the tanks already in use at Valedez.

Although EPA cannot at this time require Alyeska to continue to operate the vapor recovery system, we believe it is to Alyeska's advantage to do so. Future changes in the Clean Air Act and/or EPA regulations are of course likely and could require that the system be used in the future. The increased emissions that would occur if the vapor recovery system were shut down could degrade air quality in Valdez. Finally, these increased emissions would be considered in the emission inventory if there were an application for expansion, modification, or new construction under the Prevention of Significant Deterioration provisions of the Act.

If you have any questions, please contact Wayne Grotheer at (206)442-1396.

Sincerely,

Clark L Gaulding

Clark L. Gaulding, Chief
Air Programs Branch

cc: Stan Hungerford, ADEC
Steve Torok, AOO

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

December 31, 1987

REPLY TO ATTN OF AT-092

The Honorable J. Bennett Johnston
Committee on Energy and Natural Resources
Washington, D.C. 20510-6150

Dear Senator Johnston:

Your November 30, 1987, letter to Lee Thomas has been referred to me for reply. Your letter forwarded a concern expressed by Mr. Charles Hamel in his October 28, 1987 written testimony to the Committee on Energy and Natural Resources regarding the Arctic National Wildlife Refuge. Mr. Hamel's testimony alleged that approximately 50,000 barrels per day of natural gas liquids (NGLs) were blended into the crude oil stream for transportation through the Trans Alaska Pipeline System. Mr. Hamel's allegations have resulted in inquiries by my staff and an investigation by the Alaska Department of Environmental Conservation (ADEC), to which EPA has delegated primary responsibility for these matters.

The state of Alaska is investigating these issues. On November 17, 1987, state personnel conducted an air inspection at the Valdez terminal to determine whether improper operation of vapor recovery systems and thermal oxidizing units had occurred. The inspectors concluded that there were no violations of the existing air contaminant discharge permit and that the control equipment was working properly. The state has agreed to submit the inspection report to you and EPA as soon as it becomes available.

The second area of concern is possible infractions of Prevention of Significant Deterioration (PSD) permit requirements. I have enclosed a copy of a letter from ADEC to the Alyeska Pipeline Service Company seeking the information needed to conduct a PSD applicability determination. When we receive this information EPA and the state will be in a better position to provide you with an updated report. We will be happy to keep you informed as the investigation progresses.

If you have any further questions, please feel free to contact me or my staff members Raymond Nye at (206) 442-4226 or Mark Hooper at (206) 442-1949.

Sincerely,

Robie G. Russell
Regional Administrator

Enclosure

cc: Len Verrelli, ADEC

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF ENVIRONMENTAL QUALITY
P.O. BOX O, JUNEAU, ALASKA 99811-1800

TELEPHONE:
465-2666

December 2, 1987

CERTIFIED MAIL
RETURN RECEIPT
REQUESTED

Mr. B. L. Hilliker
Manager, Environmental Protection
and Government Report
Alyeska Pipeline Service Company
1835 South Bragaw Street
Anchorage, Alaska 99512

Dear Mr. Hilliker:

The Department of Environmental Conservation is currently in the process of updating the status of several facilities holding Prevention of Significant Deterioration (PSD) permits.

Alyeska's Pumpstations 1 to 12 and the Valdez Terminal are being reviewed for possible changes in air pollutant emission rates as a consequence of changes in production rates, operational modes, or process modifications. Any increase in pollutant emission rates above levels listed in 50.300(a)(6)(A), (B) and (C) of Alaska's Air Quality Control Regulations require a PSD-Analysis including a review for "Best Available Control Technologies" (BACT) and ambient pollutant impact analyses.

Since December 1986, North Slope producers have blended up to 50,000 bbls per day of natural gas liquids (NGL) with the crude stream. This change in the crude consistency may have raised the reid vapor pressure of the crude more than two-fold and consequently may have substantially increased emissions of fugitive petroleum vapors and vapor incinerator gases.

In 1986, two aeration systems were installed in the impound basins of the Ballast Water Treatment Plant at the Valdez Marine Terminal. The addition of the aeration systems is causing additional volatile organic compound (VOC) emissions, such as benzene, toluene, xylene, ethylbenzene, and other potentially toxic substances. Emission rate estimates by the U.S. EPA in connection with the NPDES permit for the Ballast Water Treatment Plant indicate a potential to exceed the PSD de minimus level for VOCs as listed in 50.300(a)(6)(C).

In order to determine if a PSD review is required for Alyeska's facilities, the Department requests that Alyeska provide the following information considering the time period starting August 7, 1980, to the present:

1) Annual average emission increases of fugitive VOCs in tons per year since 1980 based on material balance and unaccounted volumes of crude for the entire pipeline system from PS-1 to the Valdez Marine Terminal and individual annual increase for each Alyeska facility above the limit for VOC in 50.300 (a)(6)(C) based on evaporation loss calculation and by taking into account the available VOC controls.

2) Annual average combustion emission increases for NOX, CO, and VOC from fuel and waste gas combustion or incineration for each of Alyeska's facilities from PS-1 to the Terminal.

3) Estimated annual average fugitive VOC emissions from the aeration systems installed at the Ballast Water Treatment Plant.

4) Quantitive chemical vapor consistencies (speciations) for all fugitive VOC emission sources including the aeration systems.

5) Indicate any equipment or process changes since August 7, 1980, that may have had adverse effects on emission rates and provide recent flow or process diagrams for each vapor recovery system. Specify the type of vapor recovery in use to collect displacement vapors from the ship loading process at the marine terminal.

Please respond to this request within sixty days from the date you receive this letter. If you are unable to provide this information within the time specified, please call Len Verrelli or Erik Haas of my staff.

Department of Environmental Conservation regulations provide that any person who disagrees with any portion of this decision may request an adjudicatory hearing in accordance with 18 AAC 15.200-310. The request should be mailed to the Commissioner of the Alaska Department of Environmental Conservation, P.O. Box O, Juneau, Alaska 99811-1800, or delivered to his office at 3220 Hospital Drive, Juneau. Failure to submit a request within thirty days of receipt of this letter shall constitute a waiver of that person's right to judicial review of this decision.

Your cooperation is very much appreciated.

Sincerely,

S. W. Hungerford

Stanley W. Hungerford, Supervisor
Air and Solid Waste Management

cc: Larry Dietrick, Director
Dan Easton, Deputy Director
Al Ewing, EPA

TESTIMONY OF ARCHIE BROWER, PRESIDENT KAKTOVIK INUPIAT CORPORATION

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

My name is Archie Brower. I am President of the Kaktovik Inupiat Corporation ("KIC") of Kaktovik, Alaska. KIC is the Eskimo-owned Village corporation of the Village of Kaktovik and adjacent lands. I am familiar with the statement made by Oliver Leavitt, Vice President of the Arctic Slope Regional Corporation, to this Committee dated October 14, 1987. I wish to express the support of KIC for the statements made in that testimony.

In addition to those matters, KIC wishes to make a strong statement of support for the requirement that any solid wastes resulting from exploration or development within the Arctic National Wildlife Refuge be off-loaded to sites such as Prudhoe Bay so as to cut down on the damage that may be caused to the land and wildlife.

R. K. Bitter
Manager, Land & Contracts, U.S.
Domestic Exploration

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/629-6600

November 2, 1987

The Honorable J. Bennett Johnston
United States Senate
Washington, D.C. 20510-1802

Dear Senator Johnston:

Marathon Oil Company wishes to submit these comments for the hearing record on S. 1217 introduced by Senator Murkowski. Marathon supports the legislation to allow for the exploration, development, and production of oil and gas on the Arctic National Wildlife Refuge (ANWR). Any segmentation of the process that creates an artificial separation of development phases is strongly opposed.

Given the nature of public land legislation pending or contemplated before Congress, we suggest we sidestep the ANWR issue for a moment and look at broader implications. Current or planned activities that are detrimental to the domestic search for oil and gas and that are currently being debated actively at various governmental levels are (1) the moratorium and delays in the Outer Continental Shelf (OCS) five-year plan, (2) additional wilderness withdrawals, (3) recent interpretations of the Coastal Zone Management Act as it relates to development on the OCS, and (4) revisions of the Federal Onshore Oil and Gas Leasing Program. The combined effect of all of these activities, if enacted and sustained, would have a devastating effect on our ability to replace the oil and gas reserves in the United States, which are being depleted faster now than ever before.

Currently, over 40% of the 730 million acres owned and administered by the federal government onshore in the U. S. are off limits to oil and gas activity. This includes 89 million acres of wilderness, 77 million acres of national parks, 50 million acres in wilderness study areas, and another 100 million acres that are withdrawn from mineral entry for various other reasons. This magnitude of lock-out that benefits a small vocal group is difficult to imagine. The Multiple Use and Sustained Yield Act is still law; however, it is apparent we are headed toward single use of public lands as a dominating but foolish prerogative.

Now to return to the ANWR question. The coastal plain was kept from wilderness designation in 1977 with the express intent that the resource potential of the area should be studied further. Industry has expended over $50 million in acquiring seismic data in part so that DOI could complete the report mandated by Section 1002 of ANILCA. On the basis of this and other information, the Department has estimated potential recoverable oil of 600 million barrels (95% probability) to 9.2 billion barrels (5% probability). The median estimate of 3.2 billion barrels is, of course, a quantified guess. It may be less than this or much more. Only the drilling of dozen of wells will provide an answer to the reserve question.

The Honorable J. Bennett Johnston
Page 2
November 2, 1987

Turning to the environmental protection of the area, the example of Prudhoe Bay and the Trans-Alaska Pipeline provide a superior analog for the compatibility for oil and gas activity on the North Slope. In Louisiana, the Texas Gulf Coast, and the Kenai Peninsula exist other outstanding examples of the compatibility of oil and gas operations in wildlife refuges. Some of these are wintering grounds for the same species found in ANWR.

In conclusion, Marathon strongly supports the legislation proposed and the opening of ANWR coastal plain to a full oil and gas leasing program. The nation should focus on our vulnerability to energy disruptions and the steady decline of our domestic reserve base before enacting legislation that will be harmful to this effort.

Very truly yours,

R. K. Bitter

RKB/bh

American Farm Bureau Federation

WASHINGTON OFFICE
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SUITE 800
WASHINGTON, D.C. 20024
AREA CODE 202 - 484-2222

October 23, 1987

The Honorable J. Bennett Johnston, Chairman
Senate Energy and Natural Resources Committee
United States Senate
Washington, DC 20510

Dear Senator Johnston:

We request that this letter be included in the hearing record on the Arctic National Wildlife Refuge (ANWR) coastal plain.

The American Farm Bureau Federation, our nation's largest organization of farmers and ranchers, endorses the U.S. Department of the Interior's recommendation that Congress enact legislation to permit oil and gas exploration on the Arctic National Wildlife Refuge (ANWR) coastal plain.

While meeting in Anaheim on January 15, 1987, delegates to our national convention adopted a resolution supporting the development of energy in Alaska's coastal plain. This resolution originated with the Alaska Farmers and Stockgrowers Association (Alaska Farm Bureau) which adopted the position at its annual meeting in November 1986. It states:

> "We urge Congress to open the Alaska Arctic National Wildlife Refuge Coastal Plain to environmentally responsible oil and gas exploration, development and production."

The Farm Bureau believes that it is imperative that our nation develop all its sources of energy. Adequate and consistent supplies of energy are critical if agriculture is to continue to meet our nation's demands for fuel and fiber.

Nearly 80 percent of the energy used in agricultural production is derived from petroleum. Petroleum fuels have been an important contributor to the dramatic gains in agricultural productivity during this century.

Current economic conditions in both U.S. agriculture and energy industries make it all the more important that domestic oil and natural gas production be encouraged and the dependence on oil imports be minimized. United States agricultural and energy needs require that areas of potentially vast oil and gas resources, such as the Alaska coastal plain, not be closed off to energy exploration and development.

The Honorable J. Bennett Johnston, Chairman
October 23, 1987
Page Two

The American Farm Bureau Federation, for our more than three million families nationwide, urges Congress to open the ANWR coastal plain for oil and gas exploration and development.

Sincerely,

John Datt

John C. Datt
Executive Director
Washington Office

JCD/laf
cc: Committee Members

Koniag, Inc.

November 16, 1987

The Honorable Donald Paul Hodel
Secretary
Department of the Interior
Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Re: ANWR Land Exchange

Dear Secretary Hodel:

We have recently received a copy of Governor Cowper's letter to you dated October 28, 1987, and a copy of Critique of the proposed ANWR Land Exchanges prepared by the Alaska Division of Oil and Gas ("ADO&G"). While we would not normally comment on a position taken by the Governor in correspondence with you, the letter has been released to the press. Because of the obvious misstatements, inferences and inconsistencies in the purported analysis prepared by ADO&G upon which the Governor appears to be relying, we are compelled to respond.

As you are aware, the land exchanges present an unparalleled opportunity for the United States to acquire lands which would not otherwise be available to the United States. The acquisition of these lands and the preservation of the integrity of the refuge system is an issue of critical importance to the federal government.

In outlining the areas of greatest concern to the State, the Governor states that the exchanges will divert attention from the larger question regarding the opening of ANWR. We disagree with the Governor's conclusion as to the impact of the exchanges, because it is our belief that the exchanges provide Congress with an opportunity to acquire lands for the public which would not be

Anglo Energy Building • 4300 B Street, Suite 407 • Anchorage, Alaska 99503 • (907) 561-2668 • Telecopier: 562-5258

otherwise available. The only two groups that seem to consistently raise the exchanges in the recent hearings have been the environmental groups, who have publicly acknowledged their fear that the proposed exchanges will influence Congress to open ANWR, and the representatives of the Governor's administration. We regard the current legislation on the exchanges as reflective of Congress' concern that it reserves to itself the ultimate decision. The proposed Jones bill (H.R. 3601) clearly reflects this desire of Congress.

The Governor also goes on to state that he now opposes the exchanges because they propose to trade surface values for unknown but highly prospective subsurface values. However, in March of this year, based upon the same data, he opposed the exchanges and withdrew the State from further participation in the negotiations with the Department for entirely different and inconsistent reasons. It was his belief then that the State lacked sufficient information to determine the actual location and value of any petroleum reserves, and that, therefore, the State could not obtain desirable tracts. Thus, the Governor reasoned, given the unreliability of the data, it would be inappropriate for the State to trade known surface values for "speculative" ANWR subsurface values. It was not his concern that the concept was flawed as he now asserts. It is difficult for us to understand this inconsistency in the State's reasoning. In March, the tracts were too speculative for the State to accept in exchange for known surface values, whereas in October, the subsurface values are too prospectively valuable to be exchanged. Yet no new data has been generated in the interim. As you are aware the procedures followed by BLM to determine tract values for the exchanges are the same ones used by the United States to determine values for other disposition of oil and gas interests and, to some extent the State, in determining the acceptable level of bonus compensation under the standard leasing programs.

The Governor also faults the exchanges for not acquiring the subsurface estate in those lands where it is available. It is our understanding that decision was reached by the Department of the Interior after concluding that the subsurface had little or no potential for developable minerals, making it unwise to incur the cost of acquiring it.

The last reason given by the Governor for his opposition is perhaps the most significant--the fact that the exchanges may deprive the State of revenues from the tracts. The Governor points to the ASRC/KIC exchange as an example of this, and attempts to create the impression that this exchange is part of the pending exchange proposals. What the Governor fails to acknowledge is that under the provisions of ANILCA, ASRC had the rights to acquire the subsurface of those lands upon the opening of the Coastal Plain by Congress. Thus, in no event would the State receive any lease revenues from those lands had the exchange not been consummated. In fact, by consummating the exchange, the Department was able to acquire valuable inholdings in the National Park System at no additional cost to the United States.

With respect to the State's need for revenues, it is our understanding that, even with the very significant royalties derived by the State from its holdings at Prudhoe Bay, over 60% of the State's revenues from oil and gas is derived from taxes, the same taxes which will be levied on any interests that are acquired in the ANWR exchanges. Furthermore, our corporations are Alaska corporations which do most, if not all, of their business in Alaska. Any dollars we earn are spent locally helping the economy of the State. Our shareholders are by and large all residents of the State and likewise to the extent we are able to pay dividends, those dividend dollars are immediately put into the State's economy.

Because the Governor's position is in a large part based upon the ADO&G Critique, we have taken the liberty of attaching a brief review of that document for your consideration. In our judgment, the ADO&G Critique is not an honest and factually accurate analysis of the proposed exchanges. Inasmuch as the Governor has relied upon that Critique, he has been ill served.

We neither agree with nor understand the Governor's opposition to the proposed exchanges. Suffice it to say that his position is not shared by the Alaska State Senate which adopted a Resolution this spring addressing exchanges in a more positive light. Nor is there any evidence that it is shared by the Alaska Congressional delegation. It may be that the State administration fails to understand the implications of national policy when viewed from the more narrow perspective of State self interest. The acquisition of critical inholdings in these Refuges is a national issue which has implications far beyond the day-to-day operations of the State.

We appreciate the opportunity to correct some of the misinformation that has been so broadly circulated by the State.

Respectfully,

NATIVE LANDS GROUP

By: Steve
Margie Sagerser Brown

AKHIOK-KAGUYAK, INC.

By: Ralph L Eluska
Ralph Eluska

DOYON LTD.

By: Morris Thompson
Morris Thompson

GANA-A' YOO LIMITED

By: Max Huhndorf
Max Huhndorf

OLD HARBOR NATIVE CORPORATION

By: Emil Christiansen
Emil Christiansen

KONIAG, INC.

By: Frank Pagano
Frank Pagano

cc: Senator Ted Stevens
Senator Frank Murkowski
Congressman Don Young
Assistant Secretary William Horn

CRITIQUE OF A CRITIQUE

The following is not intended as a line-by-line rebuttal of the statements in the Critique of the Proposed ANWR Land Exchanges prepared by the Alaska Division of Oil and Gas, but seeks to address the more fundamental inaccuracies and misstatements contained in the document. These inaccuracies go to the heart of the analysis and cast very substantial doubts on its validity.

ASRC Exchange.

The Critique clearly misstates the impact of the proposed exchanges by including with them as an integral part of its analysis the 1983 Arctic Slope Regional Corporation ("ASRC") Exchange. The ASRC Exchange is in no way involved with the present proposed exchanges. Two-thirds of the lands received by ASRC under that exchange is outside the Coastal Plain as defined by Congress. Furthermore, in ANILCA, Congress mandated that upon the opening of the Coastal Plain of ANWR, ASRC was authorized to acquire those same lands by exchanging on an acre-for-acre basis other subsurface lands which it owned. It was only as the result of the 1983 exchange that the United States was able to receive any lands of value for the rights granted by Congress. Correspondingly, as the result of ANILCA, the ASRC Lands would have never been available for leasing by the United States and thus no bonus could have ever been derived from them. Notwithstanding this very obvious distinction, the author of the Critique repeatedly includes these ASRC Lands in his analysis, resulting in over a 50% overstatement of the acreage actually involved in the proposed exchanges.

Valuation.

Likewise, the State's analysis of the valuation process is equally flawed. Rather than valuing the oil and gas in place, the procedure which was utilized sought to place a value on the right to explore, develop and produce any oil and gas which might be found. There have never been any representations by the United States that oil or gas will be found under the tracts or, if found, the exchange participants will ever receive sufficient income to equal the value of the tracts as determined by BLM. While the State seeks to point out that in fact if there is oil and gas present, the value of the tract could be in excess of the value established, it fails to acknowledge that there is a greater than 80% risk that there is no oil and gas under the tract and that if there is no oil or gas, the value being charged for these rights is far in excess of the "actual value" of the tract.

The procedure utilized to arrive at the value of these rights with respect to the tracts utilizes the standard methodology followed by BLM (and to some degree the State of Alaska as well) in determining whether the compensation offered to the United States is fair value for granting such rights in a lease sale. There was, however, one important departure from the application of this methodology in the case of the valuations for the exchanges. In arriving at the exchange values, BLM added a second amount to the amount it determined to be fair compensation for the tract. The amount added was the net present value of the right of the United States to receive a royalty from any production. Thus, unlike a normal lease where the obligation to pay a royalty is dependent upon actual production, the participants were required to prepay to the United States the value of that royalty irrespective of whether or not production ever occurs from these lands. Thus, the United States bears none of the risk of whether oil or gas is present under a tract exchanged to a Native Corporation. That risk is borne solely by the Corporation and to the extent the Corporation is able to pass that risk on to a third party does not mean that the valuation process for the tracts is faulty. It should be noted that most of the participants for whatever reasons were not as successful as Old Harbor Native Corporation in passing on that risk. The participants are not in the oil and gas business and are not accustomed to taking such risks. Thus, it was only through their ability to pass on some or all of that risk to industry that they were able to go forward with the exchanges and make their inholdings available to the Refuge System.

Rescission.

Another incorrect inference suggested by the Critique is that the Native Corporations have the right to rescind the exchange and reacquire their refuge inholdings if the exploration efforts are unsuccessful, thereby depriving the United States of the consideration it received for granting those rights. While it is true that at this time one participant has negotiated a limited right to rescind the exchange with respect to a portion of its lands in consideration for the payment to the United States of an overriding royalty, of the approximately 895,000 acres of Native lands being acquired, the United States will retain approximately 820,000 acres even if that Corporation is able to exercise its rights of rescission, and even of that Corporation's inholdings, the United States will retain its best lands having a value equal to any consideration that Corporation may receive from industry, but in no event less than 35% of such lands.

Structures.

The Critique makes numerous statements regarding the Department's failure to identify all possible structures and how, based upon the State's independent analysis, every one of the 73 tracts selected by the participants is located above structures. It also asserts that all mappable closures have been exchanged or proposed for exchanges and that the tops of all of the best structures have been selected. It is surprising that this was accomplished by the identification of only 15% of the lands within Coastal Plain, and that no selections were identified in the area of the major structure core calving area and very few in some of the other identifiable structures. What is even more surprising and calls into question the accuracy of these assertions, is that a little more than seven months ago the Governor, in giving his reasons for withdrawing the State from the exchange negotiations, stated that a major reason for his action was the unreliability of the available data and the lack of sufficient data for the State to be able to make selections. After the completion of the identification process, and with no new data than the same data which was available to the Department and most of the industry advisors of the participants, the State is now able to identify structures where before the structures had fallen through the holes in the seismic grid. The one participant whose industry advisors had the data from the KIC well, however, selected on the structures mapped by DOI.

Pre Lease Exploration.
The ADO&G Critique also expresses a concern regarding the effects of any pre-lease exploration activities of the participants which might be authorized by Congress. In opposing such activities, the Critique points to the potential lost revenues from bonuses which would be paid at a lease sale from "premature condemnation" of the area based on unsuccessful exploration efforts. If Congress were to authorize such activity, it would appear that the advantages of the United States having the down-hole data from such activities would be extremely beneficial. If the results were positive, the Department could shape the lease sale accordingly. If the results were negative and the area "condemned," the unnecessary environmental impacts from the full scale exploration efforts which would follow the lease sale could be avoided. If as the results of such activities it were determined that the Coastal Plain were to have no potential, then clearly no one would advocate holding a lease sale and permitting the environmental impacts from the resulting exploration activities to occur, solely to generate a few dollars in lease bonuses.

ALASKA REFUGE EXCHANGES

SUMMARY

A. AN OVERVIEW OF THE PROPOSED EXCHANGE

For the past two years, representatives of the Department of the Interior (DOI) have been discussing the acquisition of lands within seven Alaska national wildlife refuges owned or selected by certain Alaska Native corporations.

DOI currently is negotiating with six different Native entities: (1) Koniag, Inc., the Kodiak Island regional corporation into which was merged the two former village corporations for Karluk and Larsen Bay; (2) Doyon, Limited, a regional corporation for interior Alaska; (3) Gana-A' Yoo, Limited, a consolidated corporation comprised of four former village corporations within the Doyon region; (4) Native Lands Group, L.P., a limited partnership consisting of a subsidiary of Cook Inlet Region, Inc., the regional corporation for southcentral Alaska, the Aleut Corporation, a regional corporation encompassing the lower Alaska Peninsula and Aleutian Islands, and eleven village corporations in the southcentral and southwestern Alaska; (5) Akhiok-Kaguyak, Inc., a consolidated corporation comprised of two former village corporations in the Koniag region; and (6) Old Harbor Native Corporation, a village corporation in the Koniag region. These six entities represent a total of 18 Native corporations and 25,606 Native shareholders.

The exchange is designed to benefit the National Wildlife Refuge System by acquiring approximately 891,000 acres of Native-owned inholdings in seven refuges in Alaska. The federal government would acquire the inholdings by granting the Native corporations limited oil and gas interests in the Coastal Plain of ANWR. The land exchanges will be on an equal value basis and will not be implemented until Congress enacts legislation (1) opening the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) to oil and gas exploration and development; and (2) approving the land exchanges.

Use of the surface acreage in ANWR affected by oil and gas activities will be regulated strictly. Over 100 pages of operating stipulations have been developed to date. Ownership of oil and gas interests in ANWR would expire after a pre-determined period of years; and title will be returned to the United States after completion of reclamation.

B. WHY THE NEED FOR AN EXCHANGE?

As provided by the Alaska Native Claims Settlement Act of 1971 (ANCSA), 40 million acres of land were conveyed to Native village and regional corporations in Alaska. Thereafter, nine new refuges were created and seven others expanded by the Alaska National Interest Lands Conservation Act (ANILCA), enacted in

1980. Many of these new and expanded refuges encompassed lands already selected and conveyed to Native corporations.

A major portion of the Native inholdings offered in the exchanges are inside the heart of several National wildlife refuges in Alaska and includes some of the state's most valuable habitat for brown bear, eagles, salmon, geese, moose, deer, fox, sea otter, sea lions, seals and millions of pelagic and migratory birds. These lands also provide some of the best sport fishing and hunting opportunities in the world.

Private inholdings have created many problems for refuge management, and the DOI wants to acquire the key habitat lands. ANILCA, however, does not allow the United States to acquire Native lands for refuge purposes through condemnation and federal budgetary constraints have prevented direct purchase of inholdings. Because of the land's high recreational value, some Native corporations are subject to increasing pressure to subdivide the lands for either distribution to shareholders or sale to third parties. The proposed exchanges represent a unique opportunity for the Interior Department to acquire many of the inholdings.

C. COMPARABLE VALUE EXCHANGES

The basis for the exchanges is value for value, rather than acre for acre. Each corporation will receive oil and gas rights in ANWR of comparable value to the refuge inholdings it exchanges. The value of each Native corporations' lands was established by negotiation with the DOI. Each corporation identified ANWR tracts of an equivalent value to be received if the exchanges are approved.

D. ANWR TRACT SELECTION

The DOI divided the Coastal Plain into 576 tracts, each containing approximately 2,560 acres. The Bureau of Land Management (BLM) determined the value of each tract based upon its potential for oil and gas development.

This value was determined in the same manner as a calculation for a minimum acceptable bid in a competitive federal lease sale, with one important exception. In such a lease sale, royalties, which are paid to the U.S. government if oil is found are not included in the minimum bid.

Under the exchange proposal, however, the government would not receive royalties from the tracts if production occurs. Therefore, the BLM increased the tract values by the present value of its right to receive royalties. Thus, the value of each ANWR tract included the value of the royalties the government would receive from production under a federal lease sale.

It should be noted that royalty payments would be received from a lease sale only if there is oil production, while in the case of the exchanges, the government will receive the royalty value in the form of Native inholdings whether or not there is oil production.

The participants identified tracts comparable in value to the respective value of the inholdings each is willing to exchange. As a group, 65 whole tracts and eight partial tracts covering 166,278 acres were identified. The values of these tracts ranged from $754,000 to $86.6 million, with an aggregate value of $538.7 million.

The following tables reflect the acreage each participant is willing to exchange, the exchange value of that land, the acreage selected within ANWR by each participant, the value of the selected ANWR tracts set by the DOI, and the acreage the Alaska refuge system will acquire through these exchanges.

TABLE 1

LANDS TO BE EXCHANGED AND THEIR VALUES

	Native Inholdings		Identifed ANWR Tracts	
Corporation	Acres	Value (millions)	Acres	Value (millions)
Akhiok-Kaguyak	115,000	$ 74.9	19,237	$ 74.9
Doyon	220,000	121.7	43,367	121.7
Gana-A' Yoo	56,000	35.0	21,914	35.0
Koniag	113,000	77.4	3,183	77.4
Native Lands Group	298,000	184.0	20,898	184.0
Old Harbor Native Corp.	89,000	45.7	57,579	45.7
TOTAL:	891,000	$ 538.7	166,178	$ 538.7

TABLE 2

ACREAGE TO BE ADDED TO THE ALASKA NATIONAL WILDLIFE REFUGE SYSTEM

Refuge	Acres	Native Participant
Alaska Maritime	86,000	Native Lands Group, Old Harbor
Innoko	125,000	Doyon, Gana-A'Yoo
Kanuti	75,000	Doyon
Kenai	33,000	Native Lands Group
Kodiak	261,000	Akhiok-Kaguyak, Koniag, Old Harbor
Nowitna	78,000	Doyon
Yukon Delta	233,000	Native Lands Group
TOTAL	891,000	

Sverdrup
CORPORATION

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October 27, 1987

Senator Bennett Johnston, Chairman
Senate Committee on Energy and Natural Resources
SD358 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Johnston:

We applaud the Senate Committee on Energy and Natural Resources for moving forward with hearings on how to proceed with oil and gas exploration and development in the Arctic National Wildlife Refuge of northern Alaska. In light of America's energy needs and industry's ability to develop Artic energy resources in an environmentally-sound manner, full leasing of the Coastal Plain is not only appropriate, but essential.

The oil industry has proven by their development of facilities at Prudhoe Bay that oil and gas exploration can be accomplished while maintaining stringent safeguards for our environment and wildlife.

We must recognize the importance of developing our oil and gas resources here on U.S. soil and minimize our dependence on foreign imports.

Oil and gas development in ANWR presents the nation with an opportunity to enhance energy security, reduce the balance of trade deficit and boost the economy. And it is important to note that a healthy environment does require a healthy economy. Through development of our energy resources, we will be able to afford more environmental protection.

The environmentally safe development of our natural resources in the Arctic National Wildlife Refuge will provide jobs for Americans, will provide economic growth and will bring us one step closer to energy independence.

Mr. Chairman, we submit that Senate Bill 1217 is fair, straightforward and in America's best long-term interests. We urge your support for the opening of ANWR for sound resource development.

Sincerely,

SVERDRUP CORPORATION

Carroll N. LeTellier
Vice President

cc: Senator Frank H. Murkowski
Senator Ted Stevens
Representative Don Young

TACOMA-PIERCE COUNTY CHAMBER OF COMMERCE

October 26, 1987

Tom Williams
Senate Energy & Natural Resources
Room 308
Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Williams:

As the Senate members consider the best course of action for our nation about the Arctic National Wildlife Refuge "wilderness or oil" issue, we wish to advise them of our position.

After research by the Chamber's Alaska Committee and debate within the Chamber's Board of Directors, the Chamber supports opening the ANWR Coastal Plain to environmentally responsible oil and gas exploration and potential production.

This position is taken after a comprehensive review of the arguments made by both advocates. It represents what we believe to be the correct course which matches national security and economic stability with the aesthetics of wilderness and protection of caribou.

Your consideration of this information will be most appreciated. If there is any assistance which we can provide, please call on us.

Sincerely,

David W. Graybill

David W. Graybill, CCE, CID
President and
Chief Executive Officer

gdb:DWG

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PHONE: 206-627-2175

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

1957 E Street, N.W. • Washington, D.C. 20006 • (202) 393-2040 • TELEX 279 354 AGC WSH

DANA HUESTIS, *President* JAMES W. SUPICA, *Senior Vice President* PAUL EMERICK, *Vice President*

F. THOMAS WESTCOTT, *Treasurer* HUBERT BEATTY, *Executive Vice President*

October 13, 1987

ENER[illegible]
[illegible] 1987
[illegible] DC 20510

The Honorable J. Bennett Johnston
Chairman
Committee on Energy and Natural Resources
United States Senate
364 Dirksen Senate Office Building
Washington, DC 20510

Dear Mr. Chairman:

The Associated General Contractors of America is the construction industry's largest trade association representing 32,500 firms, including 8,000 of America's leading general contractors.

AGC is pleased to know you are moving ahead with legislative hearings on S. 1217 which authorizes the leasing of public lands in ANWR for oil and gas exploration, development and production. Attached is a copy of a statement from AGC on this subject and we would respectfully request that this statement be included at the appropriate place in the hearing record.

Thank you for the opportunity to present our views on this important issue.

Sincerely,

Heidi H Stirrup

Heidi H. Stirrup
Director
Congressional Relations/Procurement

HHS/gh

Attachment

Statement of

The Associated General Contractors of America

Presented to the

Committee on Energy and Natural Resources

United States Senate

on the Subject of

Oil and Gas Leasing in the

Arctic National Wildlife Refuge

S. 1217

October 13, 1987

AGC is:

- More than 32,500 firms including 8,000 of America's leading general contracting firms responsible for the employment of 3,500,000-plus employees;
- 105 chapters nationwide;
- More than 80% of America's contract construction of commercial buildings, highways, industrial and municipal-utilities facilities.

The Associated General Contractors of America represents more than 32,500 firms, including 8,000 of America's leading general contracting companies which are responsible for the employment of more than 3,500,000 individuals. These member contractors perform more than 80 percent of America's contract construction of commercial buildings, highways, industrial and municipal-utilities facilities.

AGC is pleased to submit for the record, the following statement of the association's position in conjunction with current hearings on S. 1217, a bill to authorize oil and gas leasing, exploration and development within the coastal plain of the Arctic National Wildlife Refuge (ANWR) in Alaska.

> **AGC, by resolution adopted at its 68th Annual Convention, March 5-10, 1987, urged "that the Congress open the coastal plain of the ANWR to environmentally responsible oil and gas leasing, exploration, development and production."**

The Arctic National Wildlife Refuge is a 19 million acre area on the Northeast coastal plain of Alaska. 65 miles to the west lie the Prudhoe Bay oil fields and adjacent on the east are the MacKenzie oil fields in Canada. 8 of the 19 million acres of ANWR are designated as wilderness. In 1980, Congress set aside 1.5 million acres of the refuge for further study of its resource and wilderness value. No oil activity was allowed pending completion of the study, and until Congress enacted legislation specifically authorizing the activity. The Department of the Interior was directed to make this in-depth study and submit its report within 5 years. In November 1986, the Department issued its draft report urging Congress to open this area to oil and gas operations under strict environmental guidelines.

On April 20, 1987, Interior Secretary Hodel released the final report on the hydrocarbon and wildlife resources of the Coastal Plain. The Department's projections deal with major oil and gas fields and potential reserves which rival, perhaps even exceed those of Prudhoe Bay, the nation's largest oil discovery. The study concludes that the Coastal Plain of ANWR may be the most outstanding oil and gas frontier remaining in the United States and recommends that the entire 1.5 million acre area be opened for oil and gas leasing, under prudent environmental regulations.

Currently, Prudhoe Bay and Alaska's North Slope provide more than 20 percent of the nation's total domestic crude oil production. These resources are now in significant decline and are not being replaced. The 1.5 million acre Coastal Plain has the potential for enabling Alaska's North Slope to continue to provide a major alternative to imported oil and a very substantial contribution to national petroleum needs.

National energy forecasters now predict that oil imports may increase from the current 35 percent of the U.S. market to 50 percent by the 1990s. U.S. imports from the volatile Persian Gulf area increased 300 percent in 1986 and accounted for more than half the total increase in imports that year.

At the same time, production from current U.S. reserves is expected to decline considerably from the present 8 million barrels of oil per day to less than 3 million in the late 1990s. To compensate for this loss of production, new discoveries of domestic oil must be developed or imports will have to be increased. Much of this decline will be attributable to decreased Prudhoe Bay production, which in 1986 averaged 1.5 million barrels-per-day but will fall to 280,000 barrels-per-day by the year 2000.

It is anticipated that the earliest ANWR production could begin is 1998 to 2000 -- even if Congress approves exploration in 1987. By 2000, because of the Prudhoe Bay decline, the Trans-Alaska Pipeline System will be operating at 25 percent of its 2 million barrel-per-day capacity. ANWR development would fully utilize the pipeline and deliver critical domestic oil.

The need for orderly domestic oil and gas development has been clearly demonstrated. Also amply demonstrated is the fact that the development can be done in a way to protect the environment and wildlife.

Numerous laws and regulations assure that oil and gas activities can protect the surrounding environment. Experience in Alaska and the lower 48 states shows that oil and gas activities are consistent with other goals such as wildlife protection. Nearly 20 years of experience on the North Slope demonstrates that helping to meet the nation's energy needs and protecting our wildlife and environment are functions that can coexist to the benefit of all. Techniques employed to minimize disturbance include directional drilling, smaller and consolidated facilities, winter construction, use of temporary ice roads, special arctic equipment and elevated pipelines and facilities.

Because of the extremely long lead times needed to bring oil fields into production in the arctic, it is important that Congress move expeditiously to enact legislation to permit oil exploration and development of the Arctic National Wildlife Refuge in an environmentally responsible manner.

AGC strongly urges the Congress to do so.

SunLine
Sunline Coach Company, South Muddy Creek Road, RD1, Denver, Pennsylvania 17517 Telephone (215) 267-2858

October 15, 1987

The Honorable J. Bennett Johnston
Chairman, Energy and Natural Resources Committee
United States Senate
Washington, DC 20510

Dear Senator Johnston:

I feel it is imperative that you know how extremely concerned I am about the exploration of the Artic National Wildlife Refuge (A.N.W.R.). This exploration should be done while we still have time to use all the precautionary measures to do it safely, rather than waiting until we have an energy crisis and doing it hastily, thus jeopardizing the environment.

The record that has been demanded, expected and experienced at Prudhoe Bay should also be expected at the A.N.W.R. If no available gas or oil is found, then we have lost nothing through this exploration. If, on the other hand, oil or gas is found, we will have insulated ourselves against another oil embargo.

Sincerely,
SUN LINE COACH CO.

John W. Zimmerman
John Zimmerman
President

JZ:jh

International Association of Fish and Wildlife Agencies

444 North Capitol St., NW, Suite 534, Washington, DC 20001 (202) 624-7890
Jack H. Berryman, Executive Vice President

September 29, 1987

The Honorable J. Bennett Johnston
United States Senate
136 Hart Senate Office Building
Washington, D.C. 20510-1802

Dear Senator Johnston:

During the Association's 77th Annual meeting in Winston-Salem, North Carolina this month, the membership approved the attached position concerning proposed development of the Arctic National Wildlife Refuge for oil and gas production.

The Association's position was carefully formulated after extensive review of the proposal and many related materials. Our Land Resources Committee and the membership developed the final statement.

If you or your staff have questions, please do not hesitate to call.

Sincerely,

Gordon C. Robertson

Gordon C. Robertson
Legislative Counsel

Attachment

International Association of Fish and Wildlife Agencies
(Organized July 2, 1902)
444 North Capitol St., NW, Suite 534, Washington, DC 20001 (202) 624-7890
Jack H. Berryman, Executive Vice President

Recommendations of the Land Resources Committee
for the 1002 Area of the Arctic National Wildlife Refuge, Alaska

Adopted During the Association's 77th Annual Meeting
September 17, 1987, Winston-Salem, North Carolina

With respect to the Department of the Interior's proposal to open the Coastal Plain, or 1002 area, of the Arctic National Wildlife Refuge in Alaska to oil exploration and extraction, the Land Resources Committee recommends that the Association's position include the following tenants:

--The Association recognizes the significant and unique fish and wildlife resources of the Refuge, and unless determined to be necessary, these resources should remain undisturbed.

--That the Association does not have the expertise to judge the extent of recoverable oil reserves on the Refuge and how the national interest may be served by developing potential energy reserves there.

--Any congressional decision to explore and extract oil and gas from the Refuge must be done in such a manner so as to have minimum impact on the Refuge wildlife and make provision for the enhancement of the Nation's fish and wildlife resources.

--When appropriate, the Association should be prepared to recommend criteria and mechanisms to minimize impacts on fish and wildlife, including areas to be excluded from development.

--Unavoidable losses, especially to important wildlife habitat areas, must be offset on site to the extent possible, as a cost of exploration and extraction.

--If Congress allows energy development on ANWR, a substantial portion of all reserves generated from exploration must be used for the purposes to which the National Wildlife Refuge System was established. Activities that support that purpose include, but are not limited to:

a) Funding the North American Waterfowl Management Plan.

b) Expansion of the National Refuge System.

c) Enhancement of the Refuge Fishery Program.

d) Funding of the Fish and Wildlife Conservation Act of 1980.

--The Association will seek assurances that oil and gas development on ANWR will minimize long-range adverse impacts on the Nation's fish and wildlife resources.

EC

Rural Alaska
Community Action Program, Inc.

1987 OCT -9 [illegible] 5 21

October 2, 1987

Honorable Bennett Johnston, Chairman
Committee on Energy and Natural Resources
United States Senate
SD 358
Washington, DC 20510-6150

Dear Senator Johnston:

Advocating for the right of rural Alaskans to participate and provide input into issues and decisions that may determine their future is a primary goal of the Rural Alaska Community Action Program (RurAL CAP).

The Arctic National Wildlife Refuge debate is one such issue. The many residents of the Yukon Flats Villages (adjacent to ANWR) who depend on the Porcupine caribou and other migratory species for their subsistence, once again are requesting to be heard, and participate in this debate. They have indicated to us repeatedly this desire.

While RurAL CAP has no position on the ANWR issue itself, we do strongly believe in maximum participation of rural Alaskans throughout this debate. That is the purpose of this letter.

The Senate Committee on Energy and Natural Resources has scheduled ANWR hearings for the week of October 12. Because of the remoteness of rural villages and limited time, it is difficult for rural residents, affected by the ANWR debate, to respond to any opportunity to participate in these hearings. Village leaders in the Yukon Flats were not invited to participate, and even if so, do not have the financial resources to make the long journey to Washington, D.C. They have, though, arranged to participate in debate on ANWR scheduled for November 17th, in the U.S. House of Representatives.

We are requesting that the Energy and Natural Resources Committee schedule additional hearings during the week of November 16th, to hear the concerns of the Native Alaskans of the Yukon Flats who depend on subsistence for their nutritional and cultural survival.

Administration • P.O. Box 200908, Anchorage, Alaska 99520 • (907) 279-2511

We believe the participation of all concerned parties in the ANWR debate is in everyone's best interest.

Thank you for your careful consideration of our request.

Sincerely,

Jeanine Kennedy

Jeanine Kennedy
Executive Director

cc: Senators:

Frank Murkowski
Dale Bumpers
Wendell Ford
Howard Metzenbaum
John Melcher
Bill Bradley
Jeff Bingaman
Timothy Wirth
Chic Hecht
Wyche Fowler, Jr.
Kent Conrad
James McClure
Mark Hatfield
Lowell Weicker, Jr.
Pete Domenici
Malcolm Wallop
Don Nickles
Daniel Evans

JK:ct

THE WILDLIFE SOCIETY
5410 Grosvenor Lane • Bethesda, MD 20814 • Tel. (301) 897-9770

STATEMENT OF THE WILDLIFE SOCIETY FOR THE RECORD OF THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE, THE HONORABLE J. BENNETT JOHNSTON, CHAIRMAN

HEARING CONCERNING S. 1217, THE ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT
15 OCTOBER 1987

- submitted by Harry E. Hodgdon, Executive Director

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THE WILDLIFE SOCIETY
5410 Grosvenor Lane • Bethesda, MD 20814 • Tel. (301) 897-9770

Summary

The Wildlife Society is a nonprofit educational and scientific association comprised of over 8,100 wildlife managers, biologists, researchers, educators, and administrators serving the resource management fields worldwide. The Wildlife Society contributes objective, scientific viewpoints on wildlife and natural resource issues.

The Alaska Chapter of The Wildlife Society, representing wildlife biologists in the State, has prepared a position statement on the proposed development of the Arctic National Wildlife Refuge (ANWR).

Wildlife interests in ANWR are best served at this time by excluding development entirely or by limiting development until additional knowledge is obtained. If Congress decides against total exclusion of petroleum activities from the Refuge, the Alaska Chapter has prepared recommendations that minimize fish and wildlife habitat losses. These would:

1) Designate approximately 600,000 acres of the southeast portion of the coastal plain and the Sadlerochit Spring area as areas with no oil development at this time;

2) Explore, prior to leasing, the remainder of the 1002 area. If exploration reveals recoverable oil reserves, leasing in certain areas and under such conditions to minimize impacts based on the results of research during exploration;

3) Appoint a special Congressional commission to provide policy-level guidance on mitigation, research needs, and monitoring;

4) Establish a joint federal/state organization to prepare and implement regulations and mitigation measures that protect fish and wildlife and to oversee field activities;

5) Establish and fund a procedure for removing all development-related facilities and rehabilitating habitat after oil extraction is completed.

The Alaska Chapter's position has been adopted as an international policy of The Wildlife Society. The complete position statement is attached. Possible impacts on ANWR's biota and research needs are discussed in an additional attachment.

THE WILDLIFE SOCIETY
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Alaska Chapter - The Wildlife Society

Position Paper

Arctic National Wildlife Refuge

The Arctic National Wildlife Range (now Refuge; ANWR) was established in 1960 to protect wildlife and wilderness values for human use. In 1980 Congress enlarged the Refuge to almost 19 million acres, expanded the Refuge purposes, and designated 8 million acres of mountain terrain as Wilderness. At the same time Congress required of the Secretary of the Interior an assessment of petroleum and wildlife values of the Refuge's 1.5 million acre arctic coastal plain (or "1002 area") and reserved to itself the decision whether to allow oil and gas leasing and extraction within that area. The assessments are complete and the Secretary of the Interior has recommended leasing of the entire 1002 area on the grounds that the chance of discovering very large oil reserves outweighs the unavoidable risks to fish and wildlife habitat and populations.

Bills have been filed in Congress to open the coastal plain to leasing as recommended by the Secretary, but public sentiment is sharply divided on this issue. Counter measures have been filed to designate the entire area as Wilderness closed to leasing. Opposition to exploration and development stems from concerns about the integrity of ANWR as Wilderness and opposition to leasing of the entire 1002 area stems from concerns about impacts of development on wildlife. This position paper deals only with the latter issue.

The impacts of oil and gas development on fish and wildlife are dependent upon the timing, extent, location, intensity, and carefulness of petroleum exploration, development, and extraction activities. With present knowledge of the fish and wildlife resources of ANWR and of the functioning of arctic ecosystems, primary biological concerns under the petroleum extraction scenarios presented by the Department of the Interior include:

1. The well-being of the Porcupine Caribou Herd, now numbering about 200,000, which in most years calves and seeks relief from insect harassment on the coastal plain of the Refuge, especially the 1002 area, migrates through ANWR, and winters in Yukon Territory and northeastern Alaska, including south slope portions of ANWR;

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2. The well-being of muskoxen, reintroduced to ANWR in 1969, which now number approximately 600 and are rapidly expanding their population size and distribution, and depend on riparian and adjacent upland habitats in the 1002 area;

3. The well-being of polar bear, brown bear, wolverine, and other species of which numbers have declined following development in other areas;

4. The effects of disturbance on up to 325,000 snow geese that breed in Canada and obtain energy for fall migrations while feeding in late summer in the foothills and coastal plain of ANWR and adjacent Yukon Territory;

5. The effects of displacement of wildlife from the 1002 area on human uses of wildlife through increased human activities and community development;

6. Dewatering of streams and lakes due to demand for large quantities of water during exploratory and production drilling and oil extraction operations;

7. Loss of scarce fish overwintering areas, maintained by year-round springs, through winter water withdrawal, gravel extraction, road and pipeline construction, and other activities;

8. Loss and alteration of riparian shrub communities that are productive and often critical habitats for birds and mammals such as muskoxen;

9. Disruption of nearshore marine and brackish water ecosystems through use of causeways, drill pads, freshwater withdrawal, and other petroleum-related activities;

10. Releases of toxic materials into wetlands, waterways, and the atmosphere from drill mud disposal pits, camps, oil spills, and other sources;

11. The potential for localized overharvest of fish and wildlife due to facilitation of human access; and

12. The unknown, long-term, and cumulative effects of circumpolar arctic development on the arctic environment;

If oil is sought, found, and extracted in the Arctic National Wildlife Refuge some losses of wildlife habitat and populations are inevitable. Although experience at Prudhoe Bay and other arctic areas provides some basis for guiding development, present knowledge of fish and wildlife resources in ANWR is inadequate for generation of thorough recommendations to minimize impacts of full-scale petroleum development. For example, the relationships of Porcupine caribou with their calving and summer habitats on the coastal plain are not well understood. Similarly, we have little understanding of the potential effects of disturbance on migratory geese, or of the effects of human activities on the movements and habitat use of muskoxen.

Human interests in the well-being of ANWR wildlife are best served at this time by excluding development activities entirely, or by limiting development until additional knowledge is obtained. Congress can exclude all development by designation of the entire 1002 area as Wilderness or by taking no further action to open the 1002 area to such development at this time. The "no action" alternative would allow further review and wildlife research prior to a permanent decision.

If Congress decides against total exclusion of petroleum activities from the Refuge, it and executive agencies can take steps to minimize short- and long-term fish and wildlife habitat losses. In this case, we recommend the following:

1. Congressional designation of approximately 600,000 acres of the southeast portion of the coastal plain (Fig. 1) and the proposed Sadlerochit Spring Special Area as areas with no development for petroleum at this time. This will protect most of the calving grounds of the Porcupine Caribou Herd, important muskox habitat, preferred snow goose staging areas, and sensitive streams and rivers until additional information is available to better guide development in this most sensitive area;

2. Congressional authorization of exploration, but not leasing, on the remainder of the 1002 area, provided that appropriate mitigation measures are implemented to minimize disturbance to caribou, muskoxen , snow geese, and other wildlife. If exploration reveals recoverable oil reserves, Congressional authorization of leasing in certain areas and under such conditions to minimize impacts based on results of research during exploration;

3. Congressional commitment of adequate resources for research on caribou, muskoxen, snow geese, and other species to assess impacts and develop refined mitigation measures;

4. Implementation of a strict policy of minimal road and facility development incorporating adequate setbacks from lakes, streams, and the marine nearshore environment adjacent to the Refuge to minimize adverse effects on these important habitats;

5. Appointment by Congress of a special commission composed of experienced, knowledgeable professionals in the fields of wildlife, fisheries, geology, petroleum development, and

environmental design to provide policy-level guidance to Congress for general measures to protect fish and wildlife resources during oil and gas exploration and development, to oversee additional predevelopment research needs, to review the results and conclusions from this research in order to apply such conclusions to mitigation measures during development, and to provide recommendations on long-term monitoring of industrial impacts on key fish and wildlife species and critical aspects of their environments;

6. Establishment of a joint federal/state organization with representation from appropriate agencies for preparation and implementation of appropriate regulations and other mitigation measures to protect fish and wildlife habitats and populations during project design and construction, and to provide day-to-day oversight of development activities in the field;

7. Establishment of a procedure, with adequate funding, for removal of all development-related facilities and habitat rehabilitation after oil extraction is completed.

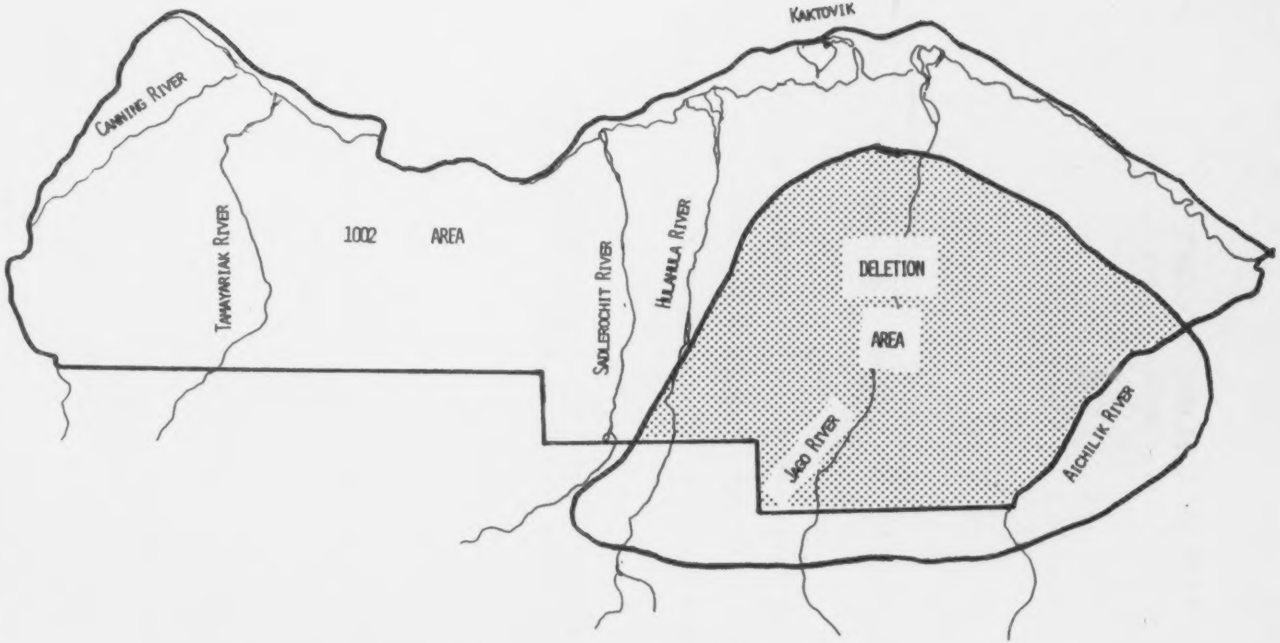
KAKTOVIK
CANNING RIVER
TAMAYARIAK RIVER
1002 AREA
SADLEROCHIT RIVER
HULAHULA RIVER
DELETION AREA
JAGO RIVER
AICHILIK RIVER

Figure 1. "1002 Area" of Arctic National Wildlife Refuge. Shaded portion recommended for deletion from exploration and development at this time.

THE WILDLIFE SOCIETY
5410 Grosvenor Lane • Bethesda, MD 20814 • Tel. (301) 897-9770

WILDLIFE AND FISHERIES CONCERNS ABOUT THE DEPARTMENT OF THE INTERIOR'S PROPOSED RECOMMENDATIONS FOR THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

- submitted by Harry E. Hodgdon, Executive Director,
The Wildlife Society, 26 October 1987

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INTRODUCTION

President Carter signed the Alaska National Interest Lands Conservation Act (ANILCA) into law in December of 1980, setting aside approximately 103 million acres of federal land in the national conservation systems of Alaska. This legislation increased the Arctic National Wildlife Range from 8.9 to 17.9 million acres, and renamed the area the Arctic National Wildlife Refuge (Figure 1). Recent additions by the State of Alaska have increased the refuge to 19 million acres.

Although ANILCA designated 8 million acres of Arctic National Wildlife Refuge (ANWR) mountain terrain as Wilderness, it did not resolve the future status of a 1.55 million acre portion of the Refuge's coastal plain. This area, referred to as the "1002 area," is located in the northernmost part of ANWR between the Brooks Range and the Beaufort Sea (Figure 2) and lies within the arctic tundra ecosystem. The arctic tundra is the last relatively undeveloped terrestrial ecosystem in North America. According to U.S. Fish and Wildlife Service standards, 99% of the 1002 area is classified as wetland.

Although the 1002 area makes up only a fraction of the entire Arctic National Wildlife Refuge, it is of crucial importance to the area's wildlife. According to Interior's Final 1002 Report, "[it] is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity."

THE 1002 REPORT

Available geological evidence suggests that the 1002 area may contain significant deposits of oil and gas. In light of this, Section 1002(h) of ANILCA required the Secretary of the Interior to conduct a study of the fish and wildlife resources of ANWR's 1002 area, to develop an oil and gas exploration program, and to prepare a report to Congress that included an assessment of the environmental impacts of future development and recommendations as to whether or not oil production should occur.

The overall responsibility for the report was given to the U.S. Fish and Wildlife Service, which completed a draft in November 1986. Dubbed the "1002 Report," DOI submitted copies to federal agencies, the Canadian government, the State of Alaska, and to conservation organizations, petroleum industries, and the media. Public hearings were held only after several conservation organizations filed suit against the Department of the Interior for failure to allow for sufficient public review and comment (Trustees for Alaska v. Hodel, 1986).

The Secretary of the Interior, Donald P. Hodel, submitted the final 1002 Report to Congress in April, 1987, recommending leasing of the entire 1002 area for oil development as soon as possible. The report states that the chances of finding vast energy resources on the area outweigh the risks of damage to ANWR's fish and wildlife. Furthermore, DOI suggested that experience at the nearby Prudhoe Bay oil field indicates that environmental protection and oil development are compatible in the arctic. The report concluded that "oil and gas activities can be conducted in the 1002 area in a manner consistent with the need and desire to conserve the area's significant environmental values."

CRITICISMS OF INTERIOR'S ANALYSIS

The conclusions of the 1002 Report were widely criticized by conservationists. Interior's assessment is thought by many to lack the information necessary to support its recommendation of full leasing. Even the U.S. Environmental Protection Agency (EPA) and the Congressional Research Service of the Library of Congress found the document wanting (The New York Times, 10 June 1987). EPA stated that the 1002 Report is "incomplete in its presentation of scientific data that would support the impact conclusions of the Secretary's recommendation" (EPA Review Comments, 1987).

Criticisms of Wildlife and Fisheries Impacts

The proposed full leasing plan could affect several species of fish and wildlife indigenous to the region:

1) Caribou (Rangifer tarandus)

The caribou is perhaps the most controversial of the species found in ANWR. Caribou are migratory animals, often travelling great distances to winter and bear their young in separate areas.

Two herds use the 1002 area. The Porcupine Caribou Herd (PCH) is the largest of the two at 200,000 animals (Whitten, 1987). It is considered by some to be the last free-roaming, migratory herd of North American caribou that can be protected in most of its range (Rogers, 1987). In some years several hundred PCH animals remain in the 1002 area year-round (Alaska Department of Fish and Game, 1987), but most of the PCH uses the 1002 area for only 6-8 weeks of its annual cycle. These 6-8 weeks during June and July, however, are thought to be critical to the herd's reproductive success.

The Central Arctic Herd (CAH) is smaller, composed of about 16,000 animals. The CAH sometimes calves in western sections of the 1002 area (Alaska Department of Fish and Game, 1987). Like the PCH, a small proportion of the herd winters in the 1002 area.

Although the PCH has not yet experienced any oil development within its range, CAH movement patterns regularly bring it into areas of oil development (Curatolo and Murphy, 1986). Avoidance of roads, pipelines, and oil facilities by the Central Arctic Herd has been documented (Cameron et al, 1979; Cameron and Whitten, 1980; Whitten and Cameron, 1983; Dau and Cameron, 1985). It is the Porcupine Caribou Herd, however, that is the chief source of the ANWR conflict.

At the heart of the controversy is the PCH calving grounds (Figure 3), the area where female caribou choose to give birth to their young. It is thought that caribou select calving grounds because of certain ecological characteristics such as early snowmelt, relative absence of predators, lack of disturbance, local abundance of food, proximity to insect relief habitat, or some combination of these factors (Lent, 1980; Cameron, 1983).

The dispute centers on whether core areas of calving (i.e., areas that traditionally experience high numbers of maternal caribou) exist, and if so, whether they exist within the 1002 area. Although some individuals contend that core calving areas do not exist, the vast majority of caribou biologists agree that most herds have clearly definable core calving areas.

Interior's Draft 1002 Report stated that 78% of the PCH core calving area was on the 1002 area. The Final Report, however, revised this figure to 27%, stating that the PCH calves in different areas each year and that only concentrated, not core, areas were found there. The Final Report neglects to mention that this calving concentration area has supported approximately 85% of the PCH's total calving activity (EPA Review Comments, 1987). If full leasing is carried out, as Interior recommends, a major disruption of this intensive-use area likely would occur.

The PCH also uses the 1002 area's coastal region for insect-relief habitat. On warm, windless days in late June and early July, caribou move to the coastline of the Beaufort Sea to escape large swarms of mosquitoes and parasitic botflies (Smith and Cameron, 1985a). Here lower temperatures and stronger winds provide escape from insect harassment. When insect harassment ceases, caribou return inland to feed (Cameron, 1983). Thus, "oscillatory movements occur between coastal habitat and inland feeding sites" (Cameron, 1983).

If caribou are constantly harassed by insects, they may reduce foraging activities and their ability to grow and fatten may decline, possibly increasing susceptibility to predation and reducing survival during winter (Dau, 1986; Interior Final Report, 1987). Therefore, preserving free movements between summer insect-relief and forage areas is "highly desirable" (Cameron, 1983).

Concern for the Porcupine and Central Arctic Caribou Herds lies not only with direct displacement of calving and insect-relief areas by oil production facilities, but also with restriction of access to those habitats. In fact, direct habitat loss is insignificant when compared to habitat that becomes unavailable to caribou because of their response to facilities and human activity that are associated with oil and gas development (Shideler, 1986).

Reduced access to important insect-relief, calving, and foraging habitats could result from development of the 1002 area (Interior Final Report, 1987). Because caribou often do not pass freely across roads and pipelines (Child, 1973; Smith and Cameron, 1985b; Curatolo and Murphy, 1986), construction of an east-west pipeline bisecting the ANWR coastal plain and the accompanying road network (Figure 4) required for development could seriously affect caribou population and distribution.

Interior's Draft 1002 Report recognized this potential impact and predicted "a major population decline and change in distribution of 20-40 percent, based on the amount of calving and insect-relief habitats to be adversely affected" (Interior Draft Report, 1986). This figure, however, did not appear in the Final 1002 Report: "[t]he percentage was related to distribution changes, but through an editing error in punctuation, the relationship was obscured." Furthermore, any percentage quantifications are "highly speculative," and accordingly have been dropped from the text, adds DOI (Interior Final Report, 1987).

The Final Report predicts only a change in distribution of the PCH: "[n]o appreciable population decline is expected as a result of oil development." This conclusion differs from the opinions of many expert wildlife biologists familiar with caribou.

Raymond Cameron, a wildlife biologist employed by the Alaska Department of Fish and Game, believes that the loss of access to favorable calving areas might be catastrophic to calving caribou, their offspring, and, ultimately, to the herd itself (Cameron, 1983). If displaced to an area of abundant predators, the effects would be even more severe (Cameron, 1983).

Officially, Interior does not believe this to be true. With extensive mitigation, DOI argues that impacts on the PCH could be minimized. Some researchers claim the experience with the Central Arctic Herd near the Prudhoe Bay complex demonstrates that coexistence of caribou and oil development is possible (Robertson and Curatolo, 1987; Maki, 1987). The CAH has nearly tripled in size since development began at Prudhoe Bay in 1974.

Many biologists, however, believe that the Porcupine and Central Arctic Herds represent substantially different ecological situations. First, the 200,000 animal PCH is some 12 times larger than the 16,000 animal CAH, yet the calving areas of the two herds are similar in size. Thus the PCH calving grounds are occupied in much higher density, exacerbating any problems from future displacement (Whitten and Cameron, 1985).

Second, because the Brooks Range veers closer to the Beaufort Sea at ANWR, the coastal plain is only about one third as wide as it is at Prudhoe Bay. Development in the northern and western portions of the PCH calving concentration area could therefore push parturient females to the east and south, closer to the Brooks Range where predator densities are higher than on the coastal plain. Biologists fear that calf survival may be reduced with such a shift in distribution.

Whitten and Cameron (1985) believe that the CAH was able to increase despite oil development within its range mainly because suitable calving habitats remain available. In contrast, development of the 1002 area could greatly reduce access to preferred calving habitat with potentially severe consequences for PCH productivity.

Another concern is that the proposed pipeline mitigation measures in ANWR may not be sufficiently effective. Although mitigation measures have reduced impacts on the CAH, these same measures may be less effective for the PCH because of greater herd size and density (Regelin, 1987). While large post-calving aggregations of the CAH number only about 4,000, the largest observed in the PCH approach 90,000 (Regelin, 1987). It appears that large groups of caribou do not readily cross roads and pipelines (Child, 1973; Murphy, 1984; Smith and Cameron, 1985b; Curatolo and Murphy, 1986), and it remains to be seen whether large aggregations of PCH caribou will cross roads and pipelines during critical periods of insect harassment.

2) Muskox (Ovibos moschatus)

Muskoxen were reintroduced into ANWR in 1969 and 1970 after extirpation by unregulated hunting in the 19th century. The ANWR population consists of 3 separate herds totalling about 475 animals (Interior Final Report, 1987). One of these herds is found in the southeastern section of the 1002 area within the PCH concentrated calving area.

One concern for muskoxen is the potential effect of gravel mining on their preferred riparian habitats. According to Interior, important forage areas could be lost due to displacement and habitat destruction.

Other concerns are possible disturbances of winter and calving habitats. Muskoxen occupy the 1002 area year-round. They decrease daily activity during the winter to conserve energy (Reynolds, 1987). Repeated disturbance during the winter could lead to increased activity, resulting in energy drains that could adversely affect overall survival and female productivity (Interior Final Report, 1987).

Calving habitat for the herds also could be affected. Human disturbance during calving can result in calves or cow/calf pairs being abandoned by the remainder of the herd (Alaska Department of Fish and Game, 1987). In its Final Report, Interior states that "[h]abitat values could be lost or reduced on nearly 75% of the high-use calving habitats."

Based on these projections, DOI concludes that "major negative effects on the 1002 area muskox population could occur from oil development." In its Draft Report DOI accordingly predicted "a change in distribution or decline affecting 25-50 percent of the population," but an April 1987 news release that accompanied the Final 1002 Report stated that muskoxen are not expected to experience any decline in numbers (Interior News Release, 1987). The Final Report states that "predicting changes in muskox numbers as a result of petroleum development would be highly speculative." Interior has been criticized for its ambiguity concerning the effects of development on this species.

3) Snow Goose (Chen caerulescens)

The 1002 area is used annually by an average of 105,000, and as many as 325,000, snow geese. These geese rest and forage on the coastal plain's wetland habitats to increase energy reserves before their annual southward migrations each fall. Interior estimates that snow geese could lose up to 45% of this preferred resting and feeding (i.e., staging) habitat if full leasing occurs.

Staging snow geese are highly sensitive to oil-development activity (Hampton and Joyce, 1985). They are especially sensitive to aircraft disturbance, a frequent occurrence over North Slope oil fields. Staging juvenile geese unable to adjust to aircraft disturbance accumulated 20% less energy reserves due to lost feeding time (Davis and Wiseley, 1974). These reserves are essential for successful migration, particularly for female snow geese recovering from the stresses of reproduction (Wildlife Federation of Alaska, 1987). Interior's Final Report states that energy reductions of this magnitude could reduce the survival of migrating geese.

Discharge of toxic substances into tundra ponds and wetlands also could affect snow geese. Spills of crude oil have eliminated several species of aquatic invertebrates fed upon by a variety of breeding tundra birds (Barsdate et al, 1980). Invertebrate populations also have been reduced or eliminated by spills of drilling byproducts, resulting in decreased habitat values for waterfowl (West and Snyder-Conn, 1986).

Disturbances combined with lost habitat from oil facility development could lead to a "moderate" reduction or change in snow goose distribution using the 1002 area, according to Interior's Final 1002 Report. Critics, however, point to the Draft Report analysis that predicted a "major" reduction or change in snow geese, and that otherwise did not differ at all from the Final Report.

4) Arctic fishes

Compared to the Prudhoe Bay area, fresh water is in relatively short supply on ANWR. Based on the amount of precipitation the area receives, ANWR is essentially an arctic desert. Critics of Interior's analysis are disturbed about the vast amounts of water required for oil exploration and production, and the lack of on-site sources.

Because severe winter conditions in the arctic drastically reduce available fresh water supplies, stream channels and pools in the 1002 area that are suitable as overwintering habitat for fish are rare (Alaska Department of Fish and Game, 1987). Any reduction in the quantity or quality of available overwintering habitat is likely to have serious impacts on arctic fish stocks (Alaska Department of Fish and Game, 1987).

Environmental professionals believe more research is needed on water supply before production can be endorsed; effects on overwintering fish could be serious if habitats froze because they were not deep enough to withstand ANWR's extremely low winter temperatures.

Interior, however, believes that overwintering habitat would be increased, because removal of gravel from streambeds creates deep pools that eventually fill with water. But gravel removal from streams and floodplains can result in channel diversions, increased sedimentation, fish blockage and entrapment, and the elimination of riparian habitat, all of which could reduce habitat quality (Alaska Department of Fish and Game, 1987). For example, at a gravel site located on the Kavik River, just west of the 1002 area, removal of stream bank cover led to a reduction in the number of arctic char juveniles as compared with control sites located downstream of the gravel removal site (Alaska Department of Fish and Game, 1987).

Scientists also are concerned about the proposed construction of causeways and sea water intake pipes. The lagoon and nearshore areas adjacent to the 1002 area represent important summer feeding habitat for anadromous arctic char, whitefish, and other fish species dispersing from North Slope drainages (Alaska Department of Fish and Game, 1987). Causeways in these areas built to connect offshore docks to land could "alter the alongshore flow of brackish water, thereby changing temperature and salinity patterns in nearshore habitats" (Craig and Griffiths, 1981; Craig, 1984). Causeways also could impede movements of fish. All these effects have since been demonstrated (Alaska Department of Fish and Game, 1987).

Seawater intake pipes are needed to acquire the large amounts of sea water (2 million barrels/day at Prudhoe Bay) that are pumped into oil wells to maintain pressure (Interior Final Report, 1987). This process increases the recoverable reserves of an oil well (Interior Final Report, 1987). Because intake pipes are constructed on causeways, fish migrating along the coastline presumably will encounter and follow the causeway, eventually reaching the sea water intake into which they could be drawn (Craig, 1984). Several intake pipes may cause considerable mortality of fish (Craig, 1984).

5) Polar Bear (Ursus maritimus)

Polar bears are present on the sea ice adjacent to the coastal plain year-round. Here they feed on ringed seals, their primary food source. Female polar bears of the Beaufort Sea population are known to den on the 1002 area, although their numbers are thought to be consistently low.

Industrial activities may threaten the security of polar bears both indirectly and directly (Amstrup et al, 1986). Increased illegal hunting would result from the influx of people into the region. Opportunities for accidental encounters between polar bears and humans would increase also. Nuisance bears posing a threat to human life would have to be killed or relocated.

The onshore polar bear denning habitat in the ANWR region merits special concern (Alaska Department of Fish and Game, 1987). Pipelines and roadways may prevent female bears from moving to and from denning areas, forcing them to den in less desirable locations (Amstrup et al, 1986). Abandonment of dens is possible if human activities disrupt denning before the cubs are ready to leave (Belikov, 1976).

Exclusion of females from denning areas would lead to a decline in the reproduction rate, concluded DOI's Final Report, but the overall population would not change as long as "similar intensive developments did not occur along the entire northern coast of Alaska and Canada." In the same section of the report, however, Interior contradicts the above statement, noting that additional polar bear habitat losses are expected from development of marine facilities in the Beaufort Sea.

"Biologists believe the Beaufort Sea population can sustain little, if any, increase in mortality of females" without suffering a population decline (Amstrup et al, 1986). Exclusion of females from denning areas and increased hunting pressures likely would result in a decline in the Beaufort Sea polar bear population; Interior has been criticized for its unclear and contradictory account of the status of this species.

6) Brown Bear (Ursus arctos)

A subspecies of the brown bear, the barren-ground grizzly bear of northern Alaska, is common on the 1002 area from late May through early July. During this period, approximately 100 of these bears move from the foothills and mountains south of ANWR to the coastal plain (Alaska Department of Fish and Game, 1987). Here they prey on calves of the Porcupine Caribou Herd (Interior News Release, 1987; Interior Final Report, 1987). The potential decline and change in distribution of the PCH food source caused by development of ANWR could result in decreased brown bear productivity and survival of young in years when alternate food sources are scarce (Interior Final Report, 1987).

Brown bears also are susceptible to disturbance during denning. Winter exploration activities are of particular concern because they occur while bears are denning. Interior has stated that activities in other seasons probably would not affect denning, as bears would simply move away from the disturbances (Interior Final Report, 1987). However, this would eliminate potential brown bear denning sites from any areas experiencing human activities that disturb bears.

The greatest concern involves brown bear interactions with humans. Brown bears habituate to human development quite readily, and often are killed in defense of life or property. (Alaska Department of Fish and Game policy does not allow for relocation of problem brown bears.) According to Interior, most brown bear deaths would probably result from human activities that attract bears--improper garbage disposal, poor food handling, or illegal feeding.

Illegal hunting of the brown bear population could rise, as well. An increased brown bear harvest occurred during construction of the Trans-Alaska Pipeline System (Follmann and Hechtel, 1983), and is the likely result of any human influx associated with oil development (Schallenberger, 1980).

Based on these additive impacts, Interior predicts a moderate decline in number or change in distribution of brown bears using the 1002 area.

7) Gray Wolf (Canis lupus)

According to the DOI Final Report, 5 to 10 wolves can be found on the 1002 area (Weiler et al, 1985). These predators use the coastal plain primarily in the summer when their caribou prey are most abundant. Although no denning has been documented on the 1002 area, some wolf dens have been found on the coastal plains to the east and west and in adjacent foothills to the south (Alaska Department of Fish and Game, 1987; Interior Final Report, 1987).

The abundance of wolves is determined by the abundance of their ungulate prey (Keith, 1983), and the possible reduction and change in distribution of the PCH could significantly affect the wolf population in the 1002 area. A positive correlation exists between prey availablity, birthrate, and survival of young wolves (Mech, 1970; Harrington et al, 1983).

Like the brown bear, the wolf's greatest threat from oil development would be from increased human presence. During construction of the Trans-Alaska Pipeline System, wolves habituated to human activity, in some cases accepting handouts from workers (Follmann et al, 1980). If habituation leads to public safety problems, some wolves may be killed to protect human lives. (As with brown bears, Alaska Department of Fish and Game policy does not allow for relocation of problem wolves.) Illegal shooting and trapping of wolves could be the most likely cause of wolf mortality, however. It is generally acknowledged that wolves have been greatly reduced from the Prudhoe Bay area since development began.

In light of this information, DOI predicts a moderate decline of the wolf population using the 1002 area if oil development is approved.

8) Wolverine (Gulo gulo)

Wolverines live throughout the 1002 area at low density (Mauer, 1985). Solitary animals, they are primarily scavengers, feeding on carcasses often left by other predators. Under certain conditions, however, a wolverine is capable of killing an adult caribou.

Because of their feeding habits, the ANWR wolverine population is closely related to those of large herbivores such as caribou and muskoxen, the animals on which they primarily feed (van Zyll de Jong, 1975). Thus any detrimental effects on the PCH and muskox could indirectly affect the ANWR wolverine population. Potential reductions in brown bear and wolf numbers, predators that hunt caribou and muskox, also could reduce the number of prey carcasses available for scavenging (Interior Final Report, 1987).

Moreover, according to DOI, wolverine distribution and movements could be altered by the presence of human activity associated with oil development. Wolverines occur exclusively in remote areas where human activity is low (Mauer, 1985), and "displacement from local areas of development is very likely" (Interior Final Report, 1987).

Increased hunting and trapping, however, probably would affect wolverines most (van Zyll de Jong, 1975). According to Interior, wolverines on the tundra are vulnerable to illegal hunting from snowmobiles and aircraft; the influx of humans into ANWR and the improved access resulting from the roads, trails, and airstrips accompanying oil development could increase these pressures.

The Department concludes that the cumulative effects of displacement, reduced food resources, and increased legal and illegal hunting and trapping "could possibly reduce by half or more the 1002 area wolverine population." DOI recommends harvest controls to mitigate effects.

9) Wilderness and Remoteness Values

The expected displacement and reduction in wildlife populations and the development of oil production facilities on the ANWR coastal plain would eliminate the present wild land values of the 1002 area. Critics of Interior's recommendation believe that Interior should be acting to conserve the few remaining wild tracts left in the U.S., not promoting their development.

Moreover, several wildlife species indigenous to ANWR require remote conditions to survive--coexistence with humans is extremely difficult and must be regulated carefully. For example, the wolverine occurs exclusively in remote regions where human activity is low (van Zyll de Jong, 1975), and it has been extirpated from the southern portions of its range as human populations have expanded (Myhre, 1967). It is thought that wolverines could flourish if "sufficiently large tracts of proper habitat were set aside and protected" (Wilson, 1982). Unmanaged wild land is a legitimate wildlife management tool and should be carefully considered as an option.

The wolf, polar bear, and brown bear also prefer isolated habitat. Although these species may adapt to human presence and activity, such interactions often lead to major behavioral and ecological disruptions. Feeding habits of bears and wolves may change when the animals become habituated to human sources of food such as garbage and food storage areas.

Wolves, brown bears, and polar bears that have become conditioned to human activity also may be dangerous to humans; they may lose their fear of humans and associate human presence with food (Craighead and Mitchell, 1982; Amstrup et al, 1986). These animals are therefore more likely to come into contact with and endanger humans. In short, "[m]aintaining large wilderness areas of prime habitat inviolate to energy exploitation is essential to the future of [human-threatening predators] throughout their range in North America" (Craighead and Mitchell, 1982).

Proponents of development believe there already is enough legally designated Wilderness available in Alaska already. Almost half of ANWR's 19 million acres currently are protected as Wilderness. However, this view neglects to consider the special importance of the coastal plain to ANWR's wildlife. In the United States, ANWR is the last sizeable arctic coastal plain that can be considered wild, and only 25 of Alaska's 1,100 miles of coastline are currently designated as Wilderness (National Wildlife Federation, 1987).

10) Long-term and Cumulative Development Impacts

As the oil and gas potential of the arctic has been recognized, the area has been exposed to development pressures previously not encountered. The U.S., Canada, the Soviet Union, and the Scandinavian countries all operate oil production facilities in their arctic regions.

The cumulative effects of development activities on the arctic environment have been largely ignored. Researchers recently have detected an "arctic haze" in the northern atmosphere that is believed to be the result of air pollution from combined arctic industrial activities (National Wildlife Federation, 1987). The effects of development on air and water quality must be addressed from a global perspective if the health of the whole region is to be maintained.

Increased development also has the potential to disrupt the ecology and migration of wildlife indigenous to the arctic. Admirably, the Soviet Union and Canada have precluded development from the core calving areas of their native ungulate populations

(Regelin, 1987).

Additionally, long-term impacts have received little attention in the DOI Report. Although U.S. oil activities in the arctic have been underway for 15 years, critics of further development argue that this is not a long time considering the fragility of the arctic ecosystem (The New York Times, 26 April 1987). Further research is needed to determine the long-term effects of development (Cameron, 1983).

Moreover, there are no funds set aside for reclamation and removal of roads and buildings for any U.S. arctic development. Costs are significant: the Alaska Oil and Gas Association estimates that restoration of oil exploration sites alone would require 1.5 to 2 times the funds needed for construction (Mahoney, 1987). If the area is to return to its previous natural state, these structures must be removed upon project completion.

Other Criticisms

1) Subsistence Peoples

The village of Kaktovik is the only settlement near the 1002 area. The settlement is composed of about 180 people, 90% of whom are Native Inupiat Eskimos. Kaktovik residents live primarily by subsistence activities; in 1978, 85% of the village's households obtained all of most of their food supply from hunting, fishing, and gathering (Peterson, 1978). Several other subsistence communities located outside ANWR harvest caribou, polar bears, and snow geese that may spend parts of their life cycle on the 1002 area.

Development of the 1002 area has the potential to severely disrupt the subsistence life of Kaktovik. According to DOI's Final 1002 Report, "[e]ffects on subsistence use species, disruption of traditional subsistence use sites, and likely psychological effects on people accustomed to isolation will result in a major adverse effect on subsistence lifestyles and a significant restriction on subsistence for the residents of Kaktovik."

Interior feels some effects will be beneficial, however, because more money would be available for the villagers to purchase guns, snowmobiles, boats, and fuel (Interior Final Report, 1987). Already, Natives have replaced kayaks with motorboats, dog teams with snowmobiles and aircraft, and bows and spears with rifles. Harvests of fish and wildlife by local residents have increased with the acquisition of these items, forcing more intensive management of caribou and polar bear populations than in previous times.

2) Water Supply

Fresh water resources are a major component of arctic oil production plans. Water is needed for exploratory drilling, ice road construction, development drilling, and human requirements.

The Draft 1002 Report identified fresh water as the major engineering problem for development of the 1002 area: "the large quantities of water required for development drilling on the 1002 area are not available." However, in its Final Report DOI omits all reference to this statement, simply stating that the limited availability of fresh water is "not a problem unique to the area."

Critics of full leasing believe Interior has not adequately addressed questions regarding the quality and site-specific sources of fresh water needed for development of ANWR. Oil development on the 1002 area may not even be possible due to the low availability of water. Moreover, fish and wildlife populations and natural processes could be affected if water cycles are disrupted.

Interior lists the following possible solutions to the ANWR water shortage, but neglects to explain any of them in detail:

a) desalinization of sea water,
b) collection and melting of snow and ice,
c) creation of water reservoirs through gravel excavation,
d) year-round tapping of non-fish-bearing rivers, lakes, and streams of the coastal plain (fish-bearing waters only in the winter).

3) Gravel Supply

If ANWR is developed, gravel will be required for roadways, airstrips, and for basal support of all buildings and structures. In the arctic environment, gravel generally is taken from stream channel and upland deposits.

There is concern that the large amounts of gravel mined (several million cubic yards) will have a detrimental effect on stream ecosystems. According to the Final 1002 Report, disruption of stream flow, water siltation, blockage and entrapment of fish, and diminished fish populations could result from mining activities. As noted earlier, at a Kavik River gravel mine, removal of stream bank cover resulted in a reduction of juvenile arctic char as compared with control areas located downstream (Alaska Department of Fish and Game, 1987).

Gravel mining from stream areas also could disrupt areas preferred by muskoxen. Important forage areas could be lost due to displacement and habitat destruction (Interior Final Report, 1987).

Reclamation of mined areas at Prudhoe Bay also has proven difficult (EPA Review Comments, 1987). If mitigation is to be effective, plans for gravel removal must include detailed procedures for the rehabilitation of the site and rehabilitation must be conducted concurrently with gravel removal (Alaska Department of Fish and Game, 1987).

4) Environmental Pollution

a) Air pollution

Air pollution will be generated by many activities associated with oil development, including air and vehicular traffic, electrical generation, and oil production activity. Of particular concern is flaring, the practice of burning off the heavy butanes and propanes on top of an oil deposit before the crude is removed (Mahoney, 1987).

Although unproven, there is concern that the arctic may be more sensitive to these emissions than other regions due to its cool and arid climate and frequent thermal inversions. Some researchers contend that the arctic already experiences a haze from drifting industrial pollution originating in the U.S.S.R. and Europe; they feel a study of the cumulative impacts of circumpolar arctic development should be undertaken before further industrialization occurs (National Wildlife Federation, 1987; Udall, 1987).

There also is concern that the vegetation of the arctic is especially sensitive to air pollution. Acidification of the tundra could result from low-level emissions even if temperate standards are met (EPA Review Comments, 1987).

DOI's view is that the current U.S. Environmental Protection Agency and State of Alaska air pollution control regulations are adequate to ensure no significant deterioration of air quality in the coastal plain. This applies to both emissions generated in the 1002 area and from related activities elsewhere.

Even so, in its Final Report Interior acknowledges that "limited data available for the Prudhoe Bay area do not allow prediction of air-quality consequences of oil development within the 1002 area." However, on the next page the Department states: "any emissions generated in the 1002 area (or from related activities elsewhere) will not cause a significant deterioration of air quality." Interior has been criticized for predicting air quality conditions with limited data.

b) Drilling wastes

Drilling muds are another source of concern. When an exploratory or production well is drilled, a special slurry is used to lubricate the drill bit and remove material cut out by the drill. These drilling muds are disposed of in gravel-lined reserve pits near the drilling pad. Discharge of toxic fluids from these pits (including brines, hydrocarbons, corrosives, and heavy metals) has occurred at Prudhoe Bay (Alaska Department of Fish and Game, 1987).

There is evidence that these reserve pit discharges kill invertebrates in nearby ponds and wetlands (West and Snyder-Conn, 1986). In situ studies of aquatic invertebrates have shown significant mortality, prolonged immobility, and reduced fecundity and growth when exposed to various concentrations of reserve pit supernatant (Alaska Department of Fish and Game, 1987). Invertebrates are key components of the arctic food web, and any damages to them could have consequences throughout the ecosystem. For example, aquatic invertebrates are a major source of food for snow geese and waterfowl; habitat values for these birds would be decreased if invertebrate populations decline.

Moreover, at Prudhoe Bay the oil industry frequently waters roads with reserve pit fluids to suppress dust. When the application eventually dries, the metals in the fluids lead to contaminated dust that can be detected up to a half a mile away from roads (Interior Final Report, 1987). Contaminated dust also causes increased alkalinity and salinity (Interior Final Report, 1987).

According to Interior, adverse impacts on invertebrates and acid-loving plants could result. This could eventually affect grazing mammals (caribou and muskoxen) and waterfowl (Interior Final Report, 1987). Nevertheless, at ANWR, "it is more likely that reserve pit fluids could be used on roads because other local water sources are limited" (Interior Final Report, 1987).

c) Oil and gas spills

A third pollution source is the mined crude oil and its derivatives. In 1985, the first full year of records of oil-spill data at Prudhoe Bay, there were over 500 spills totalling 82,216 gallons (Interior Final Report, 1987). Spills of diesel fuel also were common.

Similar to reserve pit discharges, an experimental spill of Prudhoe Bay crude oil on a tundra pond was found to eliminate several invertebrate species from the pond for at least 6 years (Barsdate et al, 1980). Direct effects of oil and fuel spills on vegetation have lasted more than 4 years (Interior Final Report, 1987). Prompt containment procedures could minimize effects on the environment, states Interior.

5) Regulatory Compliance

The U.S. Environmental Protection Agency criticized the Final Report's emissions monitoring plan. Robie Russell, Regional Administrator for EPA Region 10, found Interior vague in its description of how development would relate to existing environmental laws. Interior merely states that "a leasing program might require compliance with the National Environmental Protection Act, the Clean Water Act, and the Clean Air Act" (EPA Review Comments, 1987).

6) Canadian Objection

Canada responded to the Interior Draft Report with alarm. Because several species of wildlife migrate between Canada and the U.S., each nation has "obligations to conserve these stocks and their habitats so the value of the wildlife to the other country is not unacceptably reduced" (Government of Canada Position Paper, 1987).

In a February 1987 Position Paper, Canada accordingly urged the U.S. Government not to develop the 1002 area:

> [p]etroleum development of the 1002 area will cause significant damage to major wildlife resources that Canada shares with the U.S. with unavoidable repercussions for subsistence users in Canada. These are the primary considerations which lead the Government of Canada to urge the Government of the United States to protect the 1002 area by establishing it as wilderness.

In July of 1987, however, the two nations reached a non-binding agreement to conserve the PCH and its habitat. An International Porcupine Caribou Board made up of 4 members from each country will make recommendations on how to accomplish this goal. Written justification is required if either country chooses to ignore the board's advice.

Proponents of ANWR development argue that Canada has more than just wildlife and subsistence cultures at stake. The U.S. imports 5% of its total oil consumption from Canada (Long, 1987), and production on the coastal plain could reduce U.S. oil purchases from Canada. It is unlikely, however, that this would occur, since the U.S. probably would reduce OPEC imports first.

RESEARCH NEEDS

Critics of Interior's analysis do not believe that a sufficient data base exists to make accurate predictions about the impacts of development in the 1002 area on fish and wildlife. In their evaluations of the Draft 1002 Report, the EPA and Congressional Research Service made note of this. Their concerns, however, were still not addressed in the Final 1002 Report (EPA Review Comments, 1987).

Interior's Final Report is clouded with the words may, might, could, apparently, unknown, inconclusive, seemingly, likely, possibly, probably. It is difficult for the objective reader to agree with Interior's estimates. More information is needed on the following topics:

1) Porcupine and Central Arctic Caribou Herds
    a) Core calving areas
        Biologists do not understand why caribou prefer some calving areas over others. Physical and biological attributes of core calving areas must be compared with those of peripheral areas.
    b) Caribou movements
        Radio-collared caribou must be monitored for relatively long intervals, perhaps a decade, in order to better understand movement patterns and distribution of caribou in relation to their habitat. This would provide better information for facility siting and effective mitigation.
    c) Reaction to barriers
        Research must be undertaken to determine how large groups of caribou react to pipeline and road barriers.
    d) Predictions
        A reliable simulation model that predicts impacts of development on caribou must be designed and tested.

2) Muskox
    a) Habitat requirements and displacement
        Research is needed to determine the components of preferred muskoxen habitat. Does alternate habitat for muskoxen exist in or near the 1002 area?
    b) Winter energetics and disturbance
        It is unknown how disturbances will affect muskox winter energetics. Muskox overwintering strategy involves reduced activity--disturbances during this period could reduce survival.
    c) Impacts from development
        According to the Interior Draft Report, no information is available on the reaction of muskoxen to sustained oil development and production activities. Research is especially needed to determine impacts from gravel mining in riparian areas.

3) Snow Goose
  a) Disturbances and migration
    It is unknown how snow geese will react to aircraft and traffic disturbances, and whether this will reduce feeding time, migration survival, and breeding success.
  b) Water pollution impacts
    Effects on North Slope snow goose populations from changes in water quality of tundra ponds have not been studied adequately.
  c) Displacement habitat
    Research is needed to determine whether alternative staging habitat exists.

4) Mammalian Predators - brown bear, polar bear, gray wolf, and wolverine
  a) Human interactions
    The effects of human activity on predators must be addressed; methods for minimizing impacts also must be devised.
  b) Relations to PCH
    The relations of predator and scavenger populations to the PCH must be understood better.

5) Arctic Fishes
  a) Fresh water sources
    Sources of fresh water for development needs have not been adequately addressed; research will be needed to determine effects of water use and gravel mining on overwintering fish habitat once these sources are determined.
  b) Causeways and intake pipes
    The effects of causeways and seawater intake pipes on anadromous fish populations must be determined.

6) Air Quality

Research is needed to determine the effects of ANWR development on air quality, both in the 1002 area and throughout the entire Arctic region.

7) Cumulative and Long-term Effects

The cumulative and long-term effects of development on the fish, wildlife, and environmental values of the Arctic region must be addressed before further development occurs.

OTHER OPTIONS

Interior recommended Alternative A, full leasing, from a selection of 4 other options: B) limited leasing, C) further exploration, D) no action, and E) Wilderness designation. If

Congress chooses to develop ANWR, other options such as limited leasing and further exploration prior to leasing may be wiser given what little is known about ANWR's ecology and oil deposits.

Under limited leasing, the southeastern section of the 1002 area would not be subject to development (Figure 4). This area contains most of the core calving area of the PCH, important snow goose staging grounds, and prime habitat for a small, isolated population of approximately 80 muskoxen. Other wildlife such as brown bears, gray wolves, and wolverines that are dependent upon these species also exist in this area. The Alaska Department of Fish and Game, the agency that deals with Alaska fish and wildlife, suggests prohibition of development on the PCH calving grounds (Alaska Department of Fish and Game, 1987).

Moreover, according to Interior's Final Report, Alternative B, limited leasing, would yield a mean estimate of 2.4 billion barrels of economically recoverable oil. This is only 800 million barrels less than the mean estimate for full leasing, 3.2 billion barrels.

Using the current level of United States oil consumption per day, 16 million barrels (Interior Final Report, 1987), 800 million barrels amounts to a 50 day supply of oil. Critics of the Interior analysis point out that the majority of the PCH calving grounds, important snow goose staging habitat, a herd of 80 muskoxen, and wildlife dependent upon these species would all be risked for less than a two month supply of oil.

Alternative C, which would have mandated further exploration before leasing, also could have been recommended by DOI. This alternative would provide an opportunity to obtain more detailed information about the coastal plain's probable oil deposits. Such information would provide for a more informed decision as to where significant deposits may exist.

Interior is opposed to both limited leasing and further exploration before leasing. DOI feels the area's wildlife will not be affected severely, and therefore believes the limited leasing plan designed to protect the important wildlife habitats in the southeastern section of the 1002 area would be unnecessary. The Department considers the risks to fish and wildlife not great enough to justify the chances of "forgoing the potential for billions of barrels of oil."

Further exploration prior to leasing also was rejected by Interior. Without authorization for a leasing program, DOI maintains that the private sector would not invest the financial resources needed to completely explore the 1002 area. Interior believes additional exploration will occur only if the oil industry is assured that development also will be authorized.

Critics of the Interior analysis contend that the alternatives analyzed by DOI do not represent the full spectrum of possibilities that should have been considered for ANWR; a decision of this magnitude demands analysis of a wider range of alternatives. Additional alternatives or some combination of the five options considered would have provided a better range of options from which to choose.

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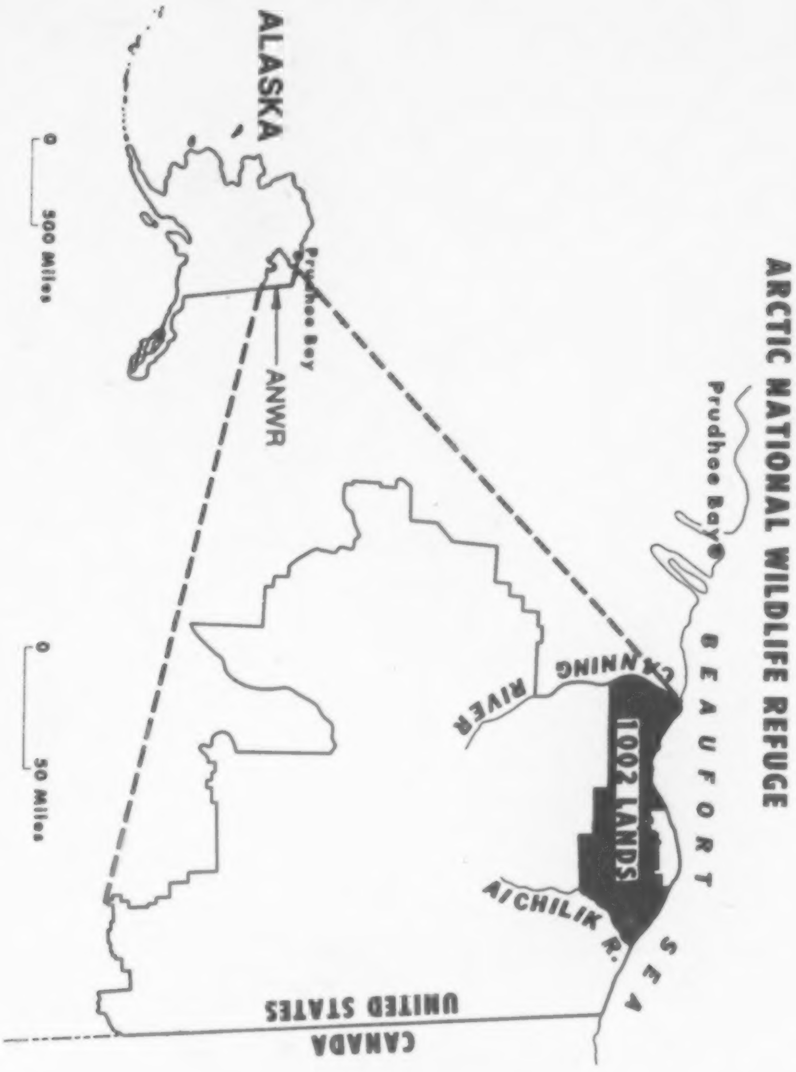

ARCTIC NATIONAL WILDLIFE REFUGE
Prudhoe Bay
BEAUFORT SEA
CANNING RIVER
1002 LANDS
AICHILIK R.
UNITED STATES
CANADA
0
50 Miles
ALASKA
Prudhoe Bay
ANWR
0
500 Miles

Figure One

From: Interior News Release,
4/20/87.

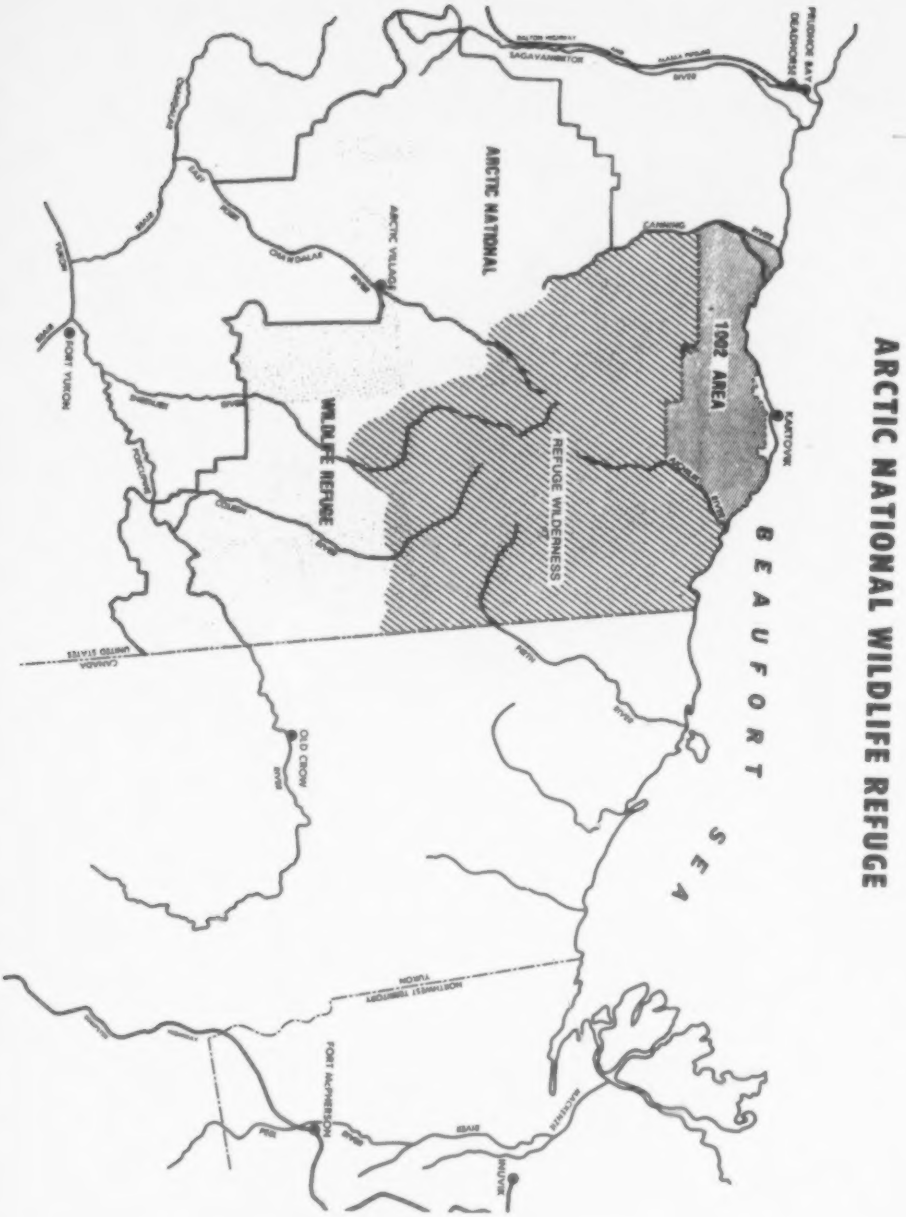
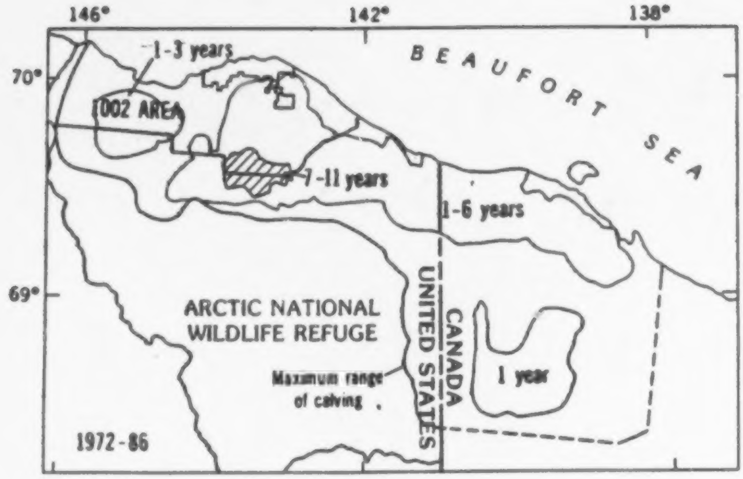

ARCTIC NATIONAL WILDLIFE REFUGE
BEAUFORT SEA
1002 AREA
REFUGE WILDERNESS
ARCTIC NATIONAL WILDLIFE REFUGE
PRUDHOE BAY
DEADHORSE
KAKTOVIK
ARCTIC VILLAGE
FORT YUKON
OLD CROW
FORT McPHERSON
INUVIK
UNITED STATES
CANADA
YUKON
NORTHWEST TERRITORY

Figure Two

From: Interior News Release, 4/20/87.


146°
142°
138°
70°
69°
BEAUFORT SEA
1-3 years
1002 AREA
7-11 years
1-6 years
ARCTIC NATIONAL WILDLIFE REFUGE
UNITED STATES
CANADA
Maximum range of calving
1 year
1972-86

composite map of all concentrated calving areas for 1972-86

▨ Concentrated calving area

☐ Total calving area

Figure Three

From: Interior Final Report,
1987.

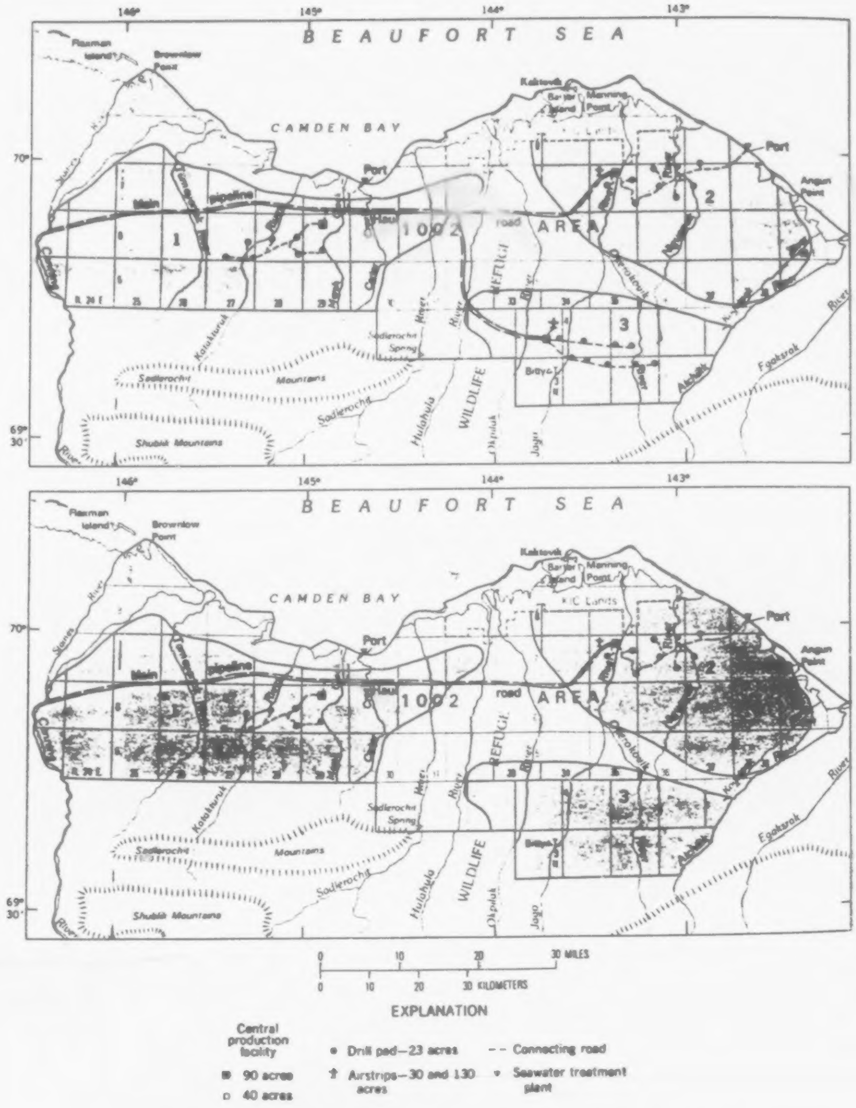

BEAUFORT SEA
146°
145°
144°
143°
70°
69° 30'
Flaxman Island
Brownlow Point
CAMDEN BAY
Kaktovik
Barter Island
Manning Point
KIC Lands
Port
Angun Point
Main pipeline
road
1002 AREA
1
2
3
Sadlerochit Spring
Sadlerochit Mountains
Shublik Mountains
WILDLIFE
REFUGE
Hulahula
Okpilak
Jago
Aichilik
Egaksrak
Kongakut
Canning River
Katakturuk
Staines River
0 10 20 30 MILES
0 10 20 30 KILOMETERS
EXPLANATION
Central production facility
90 acres
40 acres
Drill pad—23 acres
Airstrips—30 and 130 acres
Connecting road
Seawater treatment plant

Figure V-1.—Hypothetical generalized development of the 1002 area under full leasing (upper) or limited leasing (lower) if economic quantities of oil are discovered. Numbers indicate three localities (shaded) having typical prospect characteristics.

Figure Four

From: Interior Draft Report,
1986.

McDanel Refractory Company
510 Ninth Avenue/Box 560/Beaver Falls, PA 15010 0560
412 843 8300/Cable•McREFCO/Telex 86 6159

Sumner W. McDanel, Chairman and CEO

October 28, 1987

The Honorable Bennett Johnson, Chairman
Senate Energy and Natural Resources Committee
Room 308 Dirkson
U. S. Senate
Washington, D. C. 20510

Dear Senator Johnson:

Our company has been in business in Western Pennsylvania since 1919. For many years, we have maintained membership in and supported positions of the United States Chamber of Commerce. However, in the case of supporting oil and gas explorations and development in the Arctic National Wildlife Refuge, I must disagree with the position of the United States Chamber of Commerce.

I do not believe that immediate gratification of our country's lust for petroleum by destroying the last arctic wilderness in our country is good for either business or United States security. It appears to be short sighted, uni-dimensional and insensitive to competing values. I have seen no proof that there is a compelling national need for the oil that may be there, that we should exploit it now rather than later, that the potential gain is of greater value to the nation than the wilderness and wildlife that would be damaged, or that a sound decision can be made without further study and analysis of our energy needs as a whole.

Sooner or later, we must accept the fact that oil is a finite resource and that we must find clean, renewable alternatives in the near future. Conservation offers the most sensible and cost effective way to reduce oil imports immediately. Such recent governmental actions as reducing auto, small appliance, building heating and cooling standard efficiences, and cutting funding for alternative energy resources ignores the demand side of the energy equation.

Our country is suffering from lack of a coherent energy policy. Without such a plan, our energy decisions will be erratic and subject to every shift of the political winds. We could inadvertently destroy a precious national resource such as the Arctic National Wildlife Refuge.

I, personally, may or may not ever visit there, but it gives me great satisfaction to know that such wild areas continue to exist. If we explore for oil there, we could end up no better off energy wise but much poorer overall for squandering a unique wilderness area which should be preserved in pristine condition and passed down in trust to all generations of Americans yet to come.

Thank you for the oppportunity to make these comments. Please include them in your hearing record.

Sincerely yours,

Sumner W. McDanel

SWMcD:ca

EC

Tanana Chiefs Conference, Inc.
201 First Ave.
Fairbanks, Alaska 99701
(907) 452-8251

October 30, 1987

Senator Bennett Johnston
SH-136 Hart Senate
Office Building
Washington, D.C. 20510-1802

Dear Senator Johnston:

The Tanana Chiefs Conference (TCC), a Native Alaskan regional nonprofit service organization, is concerned about the proposed Arctic National Wildlife Refuge (ANWR) legislation currently before the Senate Energy Committee. Two of our member villages, Arctic Village and Venetie are entirely dependent upon the Porcupine Caribou herd as a food source. These villages do not belong to a profit making corporation (i.e. Doyon) nor are they included in the North Slope Borough. Other villages in our region would be indirectly impacted by expanded oil and gas development to the north. The proposed legislation in front of the committee does not contain adequate provisions to supply impact aid to these communities.

Arctic Village and Venetie are clearly opposed to oil and gas development in the ANWR. The people in those villages feel certain that the activity in the 1002 area would disrupt the Porcupine herd. The Department of Interior's Resource Assessment concluded that the herd would be significantly affected. Tanana Chiefs has been directed by the other member villages in the TCC region to seek impact aid for Venetie and Arctic Village should exploration and development proceed. Enclosed you will find a resolution passed at the spring Tanana Chiefs Convention establishing this position. The resolution also requests aid for mitigation of other impacts to villages adjacent to the pipeline utility and transportation corridor.

To ensure the future existence of Arctic Village and Venetie, impact aid must be made available for economic development, employment training, and for a supplemental nutritional program should there be a decline in availability of Porcupine Caribou to the villages. Venetie and Arctic Village are 100% economically and culturally dependent upon the Porcupine Caribou. Impact aid supplied for economic development could be applied toward encouraging a fledgling tourist-recreation trade. Arctic Village and Venetie are located in some of the most scenic country in the United States. Employment training would enable some members of the villages to directly participate in the construction, operation, and maintenance of the ANWR oil field. A supplemental nutritional program supplying wild game or domesticated animals adapted to their arctic environment is essential to the survival

1087-202.1

of those villages should there be a decline in availability of the Porcupine herd to those villages.

Villages adjacent to the pipeline utility and transportation corridor will be impacted by the great increase in traffic due to the development of a new oil field. These villages will experience increased competition for subsistence resources and other impacts on lands used by those villages. Some villages south of Arctic Village and Venetie also use the Porcupine herd as a food source. Funding for regional land and resource planning would help to mitigate these impacts.

The potential impacts to be experienced by villages south of the ANWR oil field were only mentioned in the ANWR 1002 Area Resource Assessment and not fully explored. It is quite clear from past experience in Prudhoe Bay that villages outside of the immediate drilling areas experience adverse effects by the activity. Mitigation efforts must be taken into consideration to buffer negative impacts.

Your consideration of this matter is sincerely appreciated. Please feel free to contact Tanana Chiefs for further information.

Sincerely,

TANANA CHIEFS CONFERENCE, INC.

Mitch Demientieff
President

TANANA CHIEFS CONFERENCE, INC.
Board of Directors

Resolution No. 87-65

Arctic National Wildlife Refuge (ANWR)

WHEREAS, the villages of Arctic Village and Venetie in the Tanana Chiefs region, as well as the Canadian Village of Old Crow are extremely dependent upon the population and distribution of the Porcupine Caribou herd as a matter of economics, nutrition, and cultural heritage; and

WHEREAS, the Porcupine Caribou herd contributes a majority of the nutritional requirements of Arctic Village, Venetie, and Old Crow and a significant economic contribution to several other Tanana Chiefs villages; and

WHEREAS, current governmental reports indicate that the Porcupine Caribou herd could suffer as much as a 40% population declines and/or change in migration paths due to oil and gas exploration and development in the Arctic National Wildlife Refuge (ANWR); and

WHEREAS, other Tanana Chiefs communities would be impacted by increased traffic in the Utility Corridor should such development were to occur; and

WHEREAS, exploitation of rural resources should accrue to the benefit of rural citizens,

NOW THEREFORE BE IT RESOLVED that the Tanana Chiefs Conference directs the TCC to advocate on behalf of the consideration for the maximum protection for the Porcupine Caribou calving and habitat areas within the ANWR in conjunction with any oil and gas exploration development in the ANWR;

AND BE IT FURTHER RESOLVED that should development occur, that the villages of Arctic Village, Venetie, and Old Crow receive impact funds for an appropriate substitute food production program to meet the needs of the future as well as the present in a manner which will enable the village to be as self-sufficient in food production as presently possible;

AND BE IT FURTHER RESOLVED that should development occur, hiring practices for exploration and development include 100% Alaskan hire with a Native preference;

AND BE IT FURTHER RESOLVED that the Tanana Chiefs Conference shall seek impact aid for the TCC region and its villages for mitigation of adverse impacts through land and resource use planning and, for employment training and placement services.

CNV-1.67

CERTIFICATION

I hereby certify that this resolution was duly passed by the Tanana Chiefs Conference, Inc. Board of Directors on March 19, 1987 at Fairbanks, Alaska and a quorum was duly established.

Sherry P. Dows for:
Daisy Northway
Secretary-Treasurer
Tanana Chiefs Conference, Inc.

Submitted by: Yukon Flats

CNV-1.68

TANANA CHIEFS CONFERENCE, INC.
Board of Directors

Letter of Intent to Accompany
Tanana Chiefs Conference, Inc. Board of
Directors Resolution #87-65
Arctic National Wildlife Refuge (ANWR)

It is clear that the Villages of Arctic Villages, Venetie, and Old Crow could experience a multi-generation taking of subsistence hunting of caribou with the exploration and development of oil and gas in the Arctic National Wildlife Refuge (ANWR). Such development would result in the planned destruction of up to an estimated 40% of the Porcupine Caribou herd.[1] If the herd altered its migration path as much as 40% it could mean up to a 100% reduction in available animals to those villages. Each one of those villages is heavily economically dependent upon the Porcupine Caribou herd for its nutritional and cultural requirements. To a lesser degree, the Villages of Fort Yukon and Chalkyitsik are economically tied to the herd as well. In contrast, the Village of Kaktovik has used the Central Arctic herd for the past 4-5 years and at varying times before that as well. The Arctic Coastal plain villages have available sea life and North Slope Borough tax base to supplement their needs. Arctic Village, Venetie, and Old Crow do not have alternative local resources, and the proposed development would not occur in a manner which would enhance any tax base available to these villages, so that these villages will not benefit from development as has the North Slope communities. These villages would be in an extremely desperate economic-nutritional situation without the Porcupine Caribou herd.

Should development occur in ANWR, compensation must be made to affected villages out of the proceeds from the lease sales in ANWR. These funds could be put into a trust fund for an appropriate substitute food production program. Such a program may include buffalo, muskox, or moose husbandry programs. Any program must provide for the future generation and not only the present as the damage to the herd could be long-standing or irreversible.

Exploration and development, if and whenever it may occur, must be done in the most environmentally protective manner possible even if such development methods are more expensive. Any exploration or development of the ANWR oil and gas resources will be at the expense of the Porcupine Caribou herd. The herd would not calve in and utilize that ecological niche without a sound ecological reason. The water quality in the development area will also be endangered triggering a variety of impacts in the food chain upon which the village depends.

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[1] The 40% figure is taken from the draft "Arctic National Wildlife Refuge Coastal Plain Resource Assessment", more commonly known as the "1002 Report".

Other villages in the Tanana Chiefs region will be affected by increased traffic in the Utility Corridor. Villagers farther away will be impacted as any other State citizen as decision makers regarding the easiest and best use of non-renewable resources.

If oil and gas exploration and/or oil and gas exploration is allowed to occur in ANWR, the Tanana Chiefs Conference will seek impact aid for the region for land and resource use planning and for employment training and placement services. With development of the field all of the TCC villages would be affected, some severely and others less so. This regional impact aid will Mitigate these impacts and will allow local benefit for this development.

I A F W A

International Association of Fish and Wildlife Agencies
(Organized July 2, 1902)
444 North Capitol St., NW, Suite 534, Washington, DC 20001 (202) 624-7890
Jack H. Berryman, Executive Vice President

October 13, 1987

Mr. Tom Williams
Senate Subcommittee on Public Lands,
National Parks and Forests
308 Dirksen Senate Office Building
Washington DC 20510

Dear Tom:

During the Association's 77th Annual meeting in Winston-Salem, North Carolina this month, the membership approved the attached position concerning proposed development of the Arctic National Wildlife Refuge for oil and gas production.

The Association's position was carefully formulated after extensive review of the proposal and many related materials. Our Land Resources Committee and the membership developed the final statement.

Sincerely,

Gordon C. Robertson by [illegible]

Gordon C. Robertson
Legislative Counsel

Attachment

International Association of Fish and Wildlife Agencies
Organized July 2, 1902)
444 North Capitol St., NW, Suite 534, Washington, DC 20001 (202) 624-7890
Jack H. Berryman, Executive Vice President
I.A.F.W.A.

Recommendations of the Land Resources Committee
for the 1002 Area of the Arctic National Wildlife Refuge, Alaska

Adopted During the Association's 77th Annual Meeting
September 17, 1987, Winston-Salem, North Carolina

With respect to the Department of the Interior's proposal to open the Coastal Plain, or 1002 area, of the Arctic National Wildlife Refuge in Alaska to oil exploration and extraction, the Land Resources Committee recommends that the Association's position include the following tenants:

--The Association recognizes the significant and unique fish and wildlife resources of the Refuge, and unless determined to be necessary, these resources should remain undisturbed.

--That the Association does not have the expertise to judge the extent of recoverable oil reserves on the Refuge and how the national interest may be served by developing potential energy reserves there.

--Any congressional decision to explore and extract oil and gas from the Refuge must be done in such a manner so as to have minimum impact on the Refuge wildlife and make provision for the enhancement of the Nation's fish and wildlife resources.

--When appropriate, the Association should be prepared to recommend criteria and mechanisms to minimize impacts on fish and wildlife, including areas to be excluded from development.

--Unavoidable losses, especially to important wildlife habitat areas, must be offset on site to the extent possible, as a cost of exploration and extraction.

--If Congress allows energy development on ANWR, a substantial portion of all revenues generated from exploration must be used for the purposes to which the National Wildlife Refuge System was established. Activities that support that purpose include, but are not limited to:

a) Funding the North American Waterfowl Management Plan.

b) Expansion of the National Refuge System.

c) Enhancement of the Refuge Fishery Program.

d) Funding of the Fish and Wildlife Conservation Act of 1980.

--The Association will seek assurances that oil and gas development on ANWR will minimize long-range adverse impacts on the Nation's fish and wildlife resources.

FTR -10-13

JOINT STATEMENT

Submitted by

C. E. DEFRIES, PRESIDENT,

NATIONAL MARINE ENGINEERS' BENEFICIAL ASSOCIATION

and

BRUCE J. CARLTON, EXECUTIVE DIRECTOR,

JOINT MARITIME CONGRESS

to the

COMMITTEE ON ENERGY AND NATURAL RESOURCES

U. S. SENATE

on

OIL AND GAS DEVELOPMENT IN THE ARCTIC NATIONAL WILDLIFE REFUGE

OCTOBER 13, 1987

JOINT STATEMENT SUBMITTED BY THE
NATIONAL MARINE ENGINEERS' BENEFICIAL ASSOCIATION
AND THE
JOINT MARITIME CONGRESS
OCTOBER 13, 1987

The National Marine Engineers' Beneficial Association, a union representing more than 10,000 American merchant marine officers, and the Joint Maritime Congress, an association representing most major U.S.-flag vessel operating companies, believe strongly that the northern portion of the Arctic National Wildlife Refuge (ANWR) should be opened to oil and gas exploration and development. We believe that action now on ANWR is extremely important to America's long-term economic, energy, and national security.

We advocate this position with one important caveat: any oil discovered in the ANWR area should be used for domestic consumption only. We recommend that this proviso be written expressly into any legislation authorizing exploration and development. It is not enough to assume that the issue is solved simply because ANWR crude will most likely travel through the pipeline to Valdez and hence be subject to the restrictions contained in the Export Administration Act of 1979, as amended. Crude oil from ANWR might, for example, be transshipped along the northern coast of Alaska to larger supertankers waiting in the Arctic Ocean above the Bering Strait. This, we note, already is being seriously contemplated by the Canadians for oil they extract adjacent to ANWR. If ANWR oil followed this path of transportation, every barrel could go for export.

Allowing the export of ANWR oil would be poor energy policy (when we already import more than 40 percent of our oil), poor security policy (since we would have to import more oil from the Middle East), and makes no sense whatsoever to the American people. Indeed, we believe that making clear to the American people that ANWR oil will be for domestic use is fundamental to ANWR approval from the start. Americans will not have it any other way.

If exploration and development are granted, they can only be justified in terms of energy security. And if this is the case, then Americans should receive ironclad assurances that energy security will not be tossed out the window for quick profits from exports once approval is granted.

Mr. Chairman, we are submitting this statement, and we have joined others in a coalition to promote ANWR development for two basic reasons.

First, opening ANWR is of great importance to the future of America's maritime industry, particularly its tanker fleet. Today, U.S.-flag carriage of Alaska's North Slope crude oil accounts for more than one-half of the U.S.-flag tanker fleet. Nearly 70 tankers are employed. As Prudhoe Bay and other fields to the west of ANWR draw down, business for these tankers will dwindle accordingly. ANWR, therefore, offers decades of potential cargoes for a fleet that otherwise would shrink with alarming speed. If we delay on ANWR, then there will be a gap, a gap that lengthens with each year of delay, between Prudhoe Bay wind-down and ANWR start-up. Tankers and crews would be idled and lost, the former to the scrap heap and the latter to other jobs. For our industry, study and more study is not an acceptable course.

Our second reason for supporting ANWR development is that the benefits to our national security of opening a portion of the ANWR area to exploration and drilling are undeniable. Its oil would flow just as Prudhoe Bay production is expected to be reduced significantly. It would help maintain the U.S.-flag merchant fleet and its availability for national defense. It would come on-stream when today's "oil glut" will probably be but a distant memory. It would provide America with an energy supply "cushion" that -- in conjunction with increased conservation and continuing efforts to reduce energy consumption and develop alternative energy sources -- would be vital in the early years of the next century. And it would reduce American dependence on imports of foreign oil, especially from the ever-volatile Middle East, helping to preserve our ability to act independently as a great nation with global responsibilities must do.

This final point, we believe, is what the entire argument over this issue boils down to -- national security and national freedom of action. Our nation will, of course, always require some imports, but opening this new field and using it to reduce imports, in conjunction with continued efforts to conserve, will enable our nation to keep these imports at prudent levels. For this reason, we reiterate that oil obtained from the ANWR area should be for domestic use only, to reduce our dependence on foreign oil as Prudhoe Bay has done already, and so successfully, for the past decade. To us, it is abundantly clear that locking away this oilfield of enormous potential in a "wilderness" status forever would only diminish seriously our national security and political and economic freedom of action -- assets that are vital in an increasingly fragmented and changing world. Local environmental impact can be minimized and dealt with successfully as it already has been in the Prudhoe Bay area. Indeed, the Prudhoe Bay experience, and the lessons learned from it, offer the opportunity to reduce even further the environmental impact that may come from exploration and drilling in the ANWR area.

For all these reasons, we believe strongly that exploration and drilling in the ANWR area should be permitted on an expeditious basis, and not delayed, or endlessly studied and reviewed at a cost of precious time. Any solution less than this is simply one our nation cannot afford.

Thank you.

STATEMENT OF ALAN J. BIRNBAUM

TO THE

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

CONCERNING S. 1217

November 2, 1987

Mr. Chairman, Committee Members:

One of the most wonderful experiences of my life will always be my wilderness adventure in the Arctic National Wildlife Refuge (ANWR). Last summer a friend and I backpacked in the 1002 Area and foothills of the North Slope of the Brooks Range between the Hulahula and Sadlerochit Rivers--part of the area that will lose its great wilderness and wildlife values if S. 1217 is passed.

I do not believe that the destructive interference with this unique, fragile and beautiful wilderness and wildlife area which will accompany oil and gas exploration and development is in the best interest of our Country. If our Country faced a certain, critical economic and energy crisis, then the decision to exploit the Refuge would be more difficult. However, since this is not the case, oil exploration in ANWR should be prohibited.

Also, the merit of oil exploration in ANWR would be different if the likelihood of finding substantial oil resources was greater, if exploration and development would be undertaken with utmost care to minimize the environmental impact and if oil development would not proceed unless the Country was in critical need of the oil resources that might be found there. Since this is not the case, oil exploration in ANWR is not in our Country's best interest.

Not long ago our frontier seemed endless and inexhaustible. Today, there are few substantial areas of wilderness in our Country. If S. 1217 is passed, an enormous and critical portion of our remaining wilderness area will be destroyed. In just over two hundred years, our Country has wasted immeasurable natural national treasures in order to realize only a small fraction of the land's complete value. We are a nation of people who allow precious and irreplaceable resources to be lost forever if only a fraction of their economic value can be realized immediately. This pattern will be repeated if S. 1217 passes. However, since this is one of our only remaining wilderness areas, what we will lose cannot be measured merely in terms of the size of the impacted area.

Only too late are we realizing that the destruction of our environment and wilderness areas for development at best delays the need to plan more carefully the direction and pace of development. The exploitation of Prudhoe Bay provides an excellent example not of oil development without serious environmental damage, but of the foolishness of pursuing immediate economic and material gains. Our present approach to oil development delays the problem of what we will do when all economically recoverable oil is gone only by years, at best. We should be addressing the problem now. Conservation and the development of alternative energy sources not oil exploration must be emphasized. In the meantime, a slower rate of oil depletion will allow time for the discovery of less destructive methods of extracting oil from such ecologically sensitive areas as ANWR in the event that such oil development occurs.

We must not repeat our mistakes by passing S. 1217. The Arctic National Wildlife Refuge must permanently be protected. I urge Congress to pass a bill designating ANWR as wilderness.

Alan J Birnbaum

Alan J. Birnbaum

STATEMENT OF LEMUEL M. SROLOVIC
TO THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
CONCERNING S. 1217

November 2, 1987

Mr. Chairman, Committee members:

My name is Lemuel M. Srolovic. I am a resident of Chattanooga, Tennessee. I am currently a third-year law student at New York University School of Law.

Although I am not a biologist, geologist, or an Alaskan, I am submitting this testimony because I am an American deeply concerned about the future of the Arctic National Wildlife Refuge. The immediate full leasing program laid out in Senate 1217 represents, I believe, a use of the Refuge fundamentally at odds with the purposes for which the Refuge was rightly established. Moreover, the oil leasing and development within the Refuge that S. 1217 seeks to authorize would not significantly address the proposed finding in section 2(a) of the bill that "the Nation's domestic crude oil production is in substantial decline and dependence upon unreliable foreign sources of oil is growing at an alarming rate...."

Undoubtedly like the vast majority of Americans, one year ago I had never heard of the Arctic National Wildlife Refuge. But after hearing someone who had flown over the Refuge coastal plain describe this corner of the United States, I was intrigued. Here was perhaps the greatest remaining wilderness in North America. Six months later I was standing in the middle of the Refuge. For ten days I hiked through the North Slope foothills between the Hulahula and Sadlerochit Rivers, crisscrossing the line on the USGS map that seperates the 1002 area from legally designated wilderness. For ten days I experienced true wilderness; the incredible open space, the grizzly bear, the caribou, the moose, the peregrine falcons, the undisturbed arctic tundra.

The wisdom of Congress in protecting this "crown jewel" for all Americans was immediately obvious. This Refuge is not simply another tract of federal land. Its wildlife habitat, wildlife populations and scenic and wilderness values are unsurpassed. This Refuge is truly a national treasure.

Senate 1217 seeks development in the area of the Refuge that the Interior Department described as "the most biologically productive part of the Arctic Refuge for wildlife [and that] is the center of wildlife activity on the refuge." The justification for developing this "American Serengeti" is the mean probability of extracting 3.2 billion barrels of crude oil.

The oil, if any, that would be pumped from the Refuge would be inordinately expensive. The costs in lost wildlife, lost habitat, lost water quantity and quality, lost air quality, would be substantial. But even more costly would be the loss of perhaps the greatest remaining North American wilderness.

The Interior Department has concluded that if oil is developed on the Refuge coastal plain, "the expected displacement and reduction of wildlife populations and natural processes would cause a major reduction in the value of the area as a pristine, natural scientific laboratory. The wilderness value of the coastal plain of the Arctic Refuge would be eliminated, except for the area of the Refuge east of the 1002 boundry...." The Department of the Interior does not, however, assess the impact of coastal plain development on the area of the Refuge already designated wilderness.

The time that I spent along the 1002 boundry convinced me that the coastal plain is not a discrete area that can be severed from the diverse, yet inextricably interrelated ecosystem that is contained within the Refuge. The caribou whose countless hooves rake the tundra raw at their river crossing near Sadlerochit Spring are oblivious to the fact that they are leaving the 1002 area and entering wilderness. Standing on a ridge in the wilderness area above the crossing site, a human can see from Mt. Chamberlain to the Beaufort Sea. Although our eyesight may be aided by binoculars and our intelligence far surpasses the caribou's, the distinction between the wilderness and the 1002 areas is not readily discernible even to humans. Developing the 1002 area, in addition to bringing disastrous environmental consequences to the coastal plain, would irreparably harm the

Refuge wilderness area. The threat posed by S. 1217 is not simply to the coastal plain, but rather the entire Refuge.

Senate 1217 asks this Country to sell this national treasure for an unknown quantity of oil. This request comes at a time when the price of oil is relatively stable and low, and a time when this Country has no energy policy beyond that of immediately selling every potential lease that can be placed on the auction block. This Country needs oil, but more oil could be saved over the next twenty-five years by increasing the gas milage of the U.S. automobile fleet by merely two gallons than the amount in the mean average estimate of oil underlying the Refuge.

A suggestion of Wallace Stegner aptly describes the appropriate response to S. 1217. "[I]nstead of violating our wilderness areas by allowing oil and mineral exploration with rigs and roads and seismic detonations, we might bear in mind what those precious places are: playgrounds, schoolrooms, laboratories, yes, but above all shrines, in which we can learn to know both the natural world and ourselves, and be at least half reconciled to what we see."

Thank you for this opportunity to testify.

Lemuel M. Srolovic

November 3, 1987

The Honorable Bennett Johnston, Chairman
Senate Energy and Natural Resources Committee
308 Dirksen Building
Washington, D.C. 20510

Dear Senator Johnston:

I would like to take this opportunity to submit written testimony on Senator Murkowski and Senator Stevens' proposed bill (S. 1217) which would open the coastal plain of the Arctic National Wildlife Refuge (ANWR) to oil and gas development.

I am a student at the New York University School of Law and have a B.A. in geology from Dartmouth College. I enjoy hiking and other outdoor activities. Since graduating from college, I have worked in the area of environmental law, specializing in solid and hazardous waste and in groundwater contamination. I represent no environmental organization. I have never been to ANWR. Nevertheless, I have studied this issue in some depth. I feel my study, along with my background and interests makes me qualified to comment on this bill. My thesis is as follows: Development of the coastal plain now is a bad idea put forth at the wrong time.

The wilderness and wildlife values of the coastal plain are unique. They are unique in their fragility, diversity of species, complexity of inter-dependence, and independence from the ways of humans. Nowhere else is such a wide range of arctic animals and plant life preserved as wilderness in one ecosystem. Scientific evidence amassed by the U.S. government and outside organizations is clear and virtually uncontroverted: Development of the coastal plain would severely compromise or destroy these unique values. There is no half-way. What is pristine is pristine only once.

Mitigation of environmental damage in the arctic is relatively untested. The long-term effects of, for example, the millions of gallons of hazardous waste that heve been dumped onto the arctic tundra are unstudied and unknown. Those studies by the U.S. EPA and Army Corps of Engineers which have looked at mitigation have found that oil companies operating in the arctic are extremely reluctant to use mitigation techniques except in rare, experimental circumstances.

Wildlife management is also a red herring as are the oft-repeated comparisons between the impact of development on wildlife at Prudhoe Bay and the predicted impact on wildlife in the coastal plain. The wildlife values of the bureaucrat or oil company executive do not work when substituted for the wildlife values of the ecosystem. Like markets, ecosystems tend to work most efficiently if left alone. Tampering with an ecosystem of the size and complexity of the coastal plain presents a problem orders-of-magnitude different from that presented at Prudhoe Bay. The results of such tampering could therefore be catastrophic for the ecosystem, whether or not any oil is found there.

The U.S. Department of the Interior estimates there is a 19% chance of there being any recoverable oil in the coastal plain. Interior maintains, however, that oil development is necessary for our national security, an issue never to be taken lightly, if in fact true.

An examination shows that the U.S. has been slack in planning for its energy needs. Over the past seven years, we have abandoned support of gas mileage standards for automobiles, increased the speed limit to 65 m.p.h., rolled back programs aimed at increasing energy efficiency for heating and cooling old and new buildings, abolished incentives for renewable energy development, slashed budgets for renewable energy research, and sold off the strategic petroleum reserve. These are the actions of an energy glutton, not a nation that fears for its energy/national security. Instead of resorting to cheap emotionalism and fear mongering based on threats to our national security -- something serious indeed -- we should first consider the above policies and the collective potential for energy conservation they represent. Taken together, they would more than negate the need for oil Interior estimates lies below ANWR.

The United States is a great and powerful nation. We are now called upon to show our strength by showing a little will-power. Before we seriously consider drilling in the coastal plain, we must, for our conscience's sake, formulate and implement a realistic long-term national energy policy.

In many ways, the respect we show for the environment is a reflection of the respect we have for our children's future since they will have to live in the world we leave behind. Should they be made to pay for our ignorance and neglect by the loss of what is potentially the most spectacular national park in our history? Obviously not. Now is not the time to drill for oil in the coastal plain. Now is the time to start thinking about conserving energy.

I urge the committee to vote against this or any other bill that would open the coastal plain of the Arctic National Wildlife Refuge to oil and gas development. I thank the committee for this opportunity to submit testimony.

Sincerely,

Thomas R. Eldridge
308 Mott Street, 5E
NY, NY 10012

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AN INHOLDER: Any person owning property or other type of equity interest within the boundary of a federally managed area or who is impacted by the management, regulation of or access to that area.
AGENCIES INVOLVED: Forest Service, Corps of Engineers, Park Service, Fish and Wildlife Service, Bureau of Reclamation and Bureau of Land Management

TESTIMONY BY

CHARLES S. CUSHMAN
EXECUTIVE DIRECTOR

NATIONAL INHOLDERS ASSOCIATION

BEFORE

PUBLIC LANDS, NATIONAL PARKS AND FORESTS SUBCOMMITTEE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
HONORABLE DALE BUMPERS, CHAIRMAN

HEARING: S.1217-- ARCTIC NATIONAL WILDLIFE REFUGE
OCTOBER 22, 1987

We appreciate the opportunity to appear here today and share our concerns regarding leasing of the Coastal Plain of the Arctic National Wildlife Refuge for oil and gas exploration.

I am Charles Cushman, Executive Director of the NIA. I am a former member of the National Park System Advisory Board and have visited and examined hundreds of parks, forests and refuges in America, including many in Alaska. My father was a ranger for the National Park Service and I served in the Student Conservation Corps in Olympic National Park in 1959.

The National Inholders Association represents those people owning private land or other interests within federal boundaries. Their property may be targets for acquisition by federal land management agencies using funds from ANWAR oil and gas development. NIA has over 15,000 members in 50 states and 200 federal areas. There are an estimated 1.2 million inholders nationwide.

Among those inholders are landowners in National Parks, recreation permittees, landowners, miners, and livestock operators in National Forests and Bureau of Land Management areas, recreation permittees in areas managed by the Corps of Engineers, users, permittees and landowners in areas managed by other federal land management agencies.

NIA SUPPORTS OPENING ANWAR IN THE NATIONAL INTEREST

Recreation and commodity production as well as many other users were threatened by the gas shortages of 1973 and 1979. Rationing made planning difficult and inhibited economic growth. The use of inholding areas was reduced and values were suppressed with reduced economic activity. All inholders share a concern that conditions that led to these previous crisis' not be duplicated.

A comprehensive energy policy that covers the needs of the recreation community, landowners, commodity producers and other Americans must guarantee the availability of adequate liquid fuels. Because of the lag time from discovery to production, a minimum of 10 years, companies must be allowed the time necessary to keep up a steady flow of oil and gas.

In that interest, NIA supports the S.1217 and the development of the Arctic National Wildlife Refuge to oil and gas production.

However, we have one major reservation. Royalties from ANWAR must not be used indiscriminatly to acquire lands from private landowners, especially against their will. Funds from ANWAR royalties will likely find their way into some form of land or wetland acquistion program. Either the Land and Water Conservation Fund or some alternate program.

NIA SUPPORTS THE ACQUISITION OF REAL WETLANDS

Unfortunately, some land acquisition agencies are using the term wetlands as a land use control mechanism. Areas that are not wetlands are called wetlands to prevent their development.

The Environmental Protection Agency and the Corps of Engineers have gone so far as to regulate how people use their backyards using wetlands identification as the pretext. The current Advanced Identification Program by EPA and the Corps as well as their Isolated Wetlands programs are going far beyond what Congress ever intended.

With recent Supreme Court decisions regarding the taking of private property, through regulation, significant risks now fall on those agencies that go too far. With the development of ANWAR, agencies may feel there is little risk to expanding their regulatory programs because thay will have plenty of money to buy the land if the courts say they crossed the line.

While NIA believes that if landowners are deprived of the use of their land for public (wetland protection) purposes, the government should pay for the rights taken by regulation, we are concerned about a huge increase in indiscriminate acquisition. Without adaquate safeguards in any wetland or land acquisition funding mechanism, massive amounts of non-critical lands may be purchased while truly critical lands are not protected. The Land and Water Conservation Fund is an example of how this can happen.

$5 BILLION BACKLOG IN LAND ACQUISITION

NIA supports continued land acquisition, where appropriate, to meet congressional intent and clearly defined public recreation and wetlands needs. The Land and Water Conservation Fund has failed on both counts.

Billions of dollars have been wasted through mismanagement of the fund. Promises of increased recreation through the fund have not become a reality. A careful review of recreation increases will show them largely unrelated to funding provided by the Land and Water Conservation Fund.

The result has been a trail of lands purchased that should not have been, critical lands which have been ignored, and thousands of concerned landowners and communities whose rights have been abused. A minimum $5 billion backlog exists in congressionally authorized LAND PROTECTION---not land acquisition. If alternatives to fee title had been used, there would be no backlog. No new funding systems should be created without carefully crafted systems to make sure the money is not wasted.

The LWCF, instead of increasing recreation, has reduced it in many areas by buying out resorts and other visitor facilities and closing them down. The result has been to eliminate recreation opportunities or transfer them to users who prefer little or no developed facilities. A review of the General Accounting Office Report on Lake Chelan documents these charges.

In other areas the LWCF has been used to achieve political goals, buying up land without regard to the need for that land or whether it was required to meet legislative intent and often without following the requirements of Public Law 91-646, The Uniform Acquisition and Relocation Act.

The attached article, "Park Service Land-Grab" from THE PROGRESSIVE gives some insight into this problem with specific examples. Unfortunately, there are many.

LWCF IN SOME CASES HAS BEEN ANTI-RECREATION AND RESOURCE PROTECTION

The result is that the LWCF has actually been anti-recreation. We would suggest that most of the federal portion of the $6.5 billion spent under the fund has not benefited the recreating public. There are a few examples where LWCF expenditures have clearly produced a recreation increase consistent with congressional intent. In others it has been a tool for abusive land use control.

The LWCF is devoted to land acquisition on the federal side, while no monies go for rehabilitation or development. The result is bigger parks with less land and facilities usable by the public due to deferred maintainance and dispersed staff. The public perception is that the parks have lots of money when, in fact, recreation delivery and resource protection are suffering.

Olympic National Park is a good example. This committee or its representatives should examine all the land acquired in Olympic through the LWCF. Ask yourselves how much of this land is available and usable by the public? Then ask if the land could have been protected using less costly means, making money available for other high priority purchases.

LWCF funds should be available to resource managers for rehabilitation. They can make the onsite decision how best to meet the needs of the public.

EASEMENTS AND OTHER ALTERNATIVES

Easements and other alternatives have still not been accepted by the federal agencies, particularly the Park Service. In fact, the Park Service has found an ingenuous way of forcing landowners to sell in fee title when they have used up their statutory condemnation authority.

On the St. Croix River the agency is going after landowners using public access easements so strict that no one in their right mind would accept them. The Park Service then threatens the use of condemnation to get the easement or the landowner can sell in fee willingly. The landowners are selling. As a result, the agency continues to disobey congressional intent on the St. Croix as documented in the May, 1978 GAO report on Wild and Scenic Rivers and the December 1979 GAO report on land acquisition. They are buying more land than than they need or that was intended by law.

The tragedy is that these tactics only prevent the protection of new rivers largely because of distrust by states, communities and landowners of the river protection process. GAO confirmed that it was land agency tactics that were slowing the protection of Wild and Scenic Rivers in their 1978 report.

NIA does not say that the land should not be protected. We do say that vast sums have been wasted because the money has been spent with the agency mindset that they might as well buy it all in fee title because they're going to own it all someday anyway. Concern about this attitude was documented by GAO.

GENERAL ACCOUNTING OFFICE REPORTS

The General Accounting Office has produced numerous reports critical of the federal agencies' use of the LWCF. In short, GAO has said the federal agencies have purchased more land than Congress intended, did not follow the intent of Congress, paid too much for it, did not prioritize the land they wished to buy resulting in unneeded purchases, and in general did not pay attention to the needs of local landowners, communities or local government.

When GAO said the Park Service paid too much, they didn't mean individual landowners. They meant that cost saving alternatives to fee acquisition authorized by Congress were not used thus substantially increasing the cost of some projects beyond congressional expectations. Huge cost overruns became the norm with little relationship between expenditures, land protection and increased recreation.

Despite this evidence of problems, the President's Commission on Americans Outdoors recommended buying out the backlog, or words to that effect. It is ironic that in the same report they say that use of the big parks, and parks a long way from people, is actually decreasing or stabilizing. With our national population getting older, the real need is for recreation close to where the people live.

How does that jive with spending billions to buy out inholders in older areas far removed from poplulation centers who, in nearly all cases, are not a threat to the parks? In fact, they are often assets representing the culture and history of the areas. Yet the agencies seek to destroy these people while not supplying the recreation where it is needed.

LAND ACQUISITION AND EMINENT DOMAIN

One of the key dangers associated with the Land and Water Conservation Fund is that it allows the use of condemnation. No question some condemnation is appropriate. But what happens when you tell an agency they have $100 million, they can only buy land with it, and they have the awesome power of eminent domain?

Condemnation has been used much more sparingly in the current Administration. Yet the seeds for disaster have been sown. With little oversight, the agencies have run amok over rural people and the country and federal land protection agencies are the lesser for it. Any re-authorization of the LWCF or other funding alternative should include language to control condemnation excesses of the past.

HOW MUCH IS ENOUGH?

So the question must be asked--HOW MUCH IS ENOUGH LAND FOR THE GOVERNMENT TO OWN? Is it the policy of this country to destroy private property and small rural communities? Can we afford to buy all the nice places? Should we instead work to make partners out of landowners instead of enemies?

One of the founding principles of this country is private property ownership, yet the Land and Water Conservation Fund appears to be an enemy of private property.

It doesn't have to be that way. There can be private property while still providing for public recreation and resource protection. The government owns over one third of the nation's land now. Why not require that for every acre that is acquired, one of equal economic value must be sold? We can protect land and the quality of our holdings without threatening one of the basic tenets of the founding fathers.

CONCLUSION

ANWAR royalties should go directly to the treasury until the whole acquisition process revamped. Any new funding vehicle supported by ANWAR royalties should be carefully crafted to learn from the mistakes of the Land and Water Conservation Fund. The Interior Department's 1982 Land Protection Planning regulations should be implemented to insure that only high priority lands are acquired and wherever possible, only from willing sellers.

No trust fund should be set up that avoids the full appropriations and oversight process. Recreation and wetland acquisition funding should have to compete against other national and social priorities in the normal appropriations process. Congress should carefully review its oversight procedure with respect to the LWCF and pay more attention to reports by the General Accounting Office of abuses by the agencies using LWCF funds.

The Arctic National Wildlife Refuge should be opened for oil exploration and production. It is clearly in the national interest and there is little documentation of threats to the wildlife population. In fact, there is evidence that the wildlife population has been enhanced by the presence of oil development at Prudhoe Bay.

ANWAR should not be held hostage as a tool to extort money for increased land acquisition. The present land acquisition process is wasting so much money and is so poorly run, the whole recreation funding and delivery system needs significant modifications before any increase in funding is considered.

ALSO SUBMITTED AS PART OF THIS TESTIMONY:

"Park Service Land-Grab", THE PROGRESSIVE, October 1985.

PARK SERVICE LAND-GRAB

The Rangers put people out to pasture

BY MICHAEL J. WEISS

For most of her thirty-five years, Amy Anderson has lived in the same house in the lush woodlands of northeastern Ohio's Cuyahoga Valley. The fifth generation of her family to reside in the valley, she grew up just down the road from her grandfather's farm. When she married, she chose to remain in her birthplace. "I wanted my kids to enjoy the same pleasures as I did growing up in the valley," says Anderson from her modest, two-story frame house.

But in 1975, Anderson and her neighbors learned that the National Park Service wanted their land. The Government had turned the Cuyahoga Valley into a national recreation area, and during the next decade, it bought almost 400 homes in the vicinity, razing many with bulldozers. A Government wrecking crew demolished her grandfather's barn, where she had played as a child. And last year, Anderson received notice that her own house was to be purchased.

Though many of her neighbors simply settled on a price and sold out, Anderson vowed to stay and fight. "They asked how much we wanted for the place, and I said we just wanted to be left alone," she recalls, her voice rising in anger. "You can't put a value on living in a community for five generations."

Anderson is one of an estimated 35,000 Americans who may lose their homes to the Park Service's land acquisition program. Many of the residents are fighting the Government's efforts to absorb their property into the seventy-nine million acres of national parks—a program the victims call the Park Service land-grab.

"The Park Service is systematically trying to destroy whole communities," says Charles Cushman, president of the National Inholders Association, which represents the 11,000 homeowners who live on Federally owned lands. "People who've lived in areas for generations are being forced out. We've become second-class citizens in our own country."

In 1965, when the Federal Treasury was flush with hundreds of millions of dollars from the sale of offshore oil leases, Congress directed the Park Service to set up its land-buying program—even when park managers could not maintain areas already in their possession. "It used to be that every Congressman wanted to have his name on a public works project," Cushman says. "Now they want a park."

In Pruitt, Arkansas, the creation of the Buffalo National River Area virtually wiped out a community of seventy-five families, many of them poor and elderly. One lifelong resident vowed, "If they take my land, they take me." Just one week after he received his condemnation notice, he died of a heart attack. "The Park Service worried him to death," contends Lucile Hanson, the seventy-five-year-old former town mayor who reluctantly moved after a six-year fight.

In Ochopee, Florida, the Government tried to railroad the community into making way for the 500,000-acre Big Cypress National Preserve. Federal buyers offered the Harmon family a low figure for 1,000 acres of property. "When my father resisted, the Park Service agent said, 'We've done some checking up on you, and we know that if you don't sell you'll go bankrupt before the case goes through court,'" recalls Lawrence Harmon, who clandestinely recorded the 1978 negotiations. "Then the agent said he'd quit the Park Service and help my father invest the money he received."

Harmon's father rejected both offers, took the case to court, and six years later accepted a settlement figure 50 per cent higher than the original bid.

In 1979, a Park Service agent offered Lawrence Harmon $30,500 for his two-bedroom, wood-frame house, which a bank appraiser had assessed at $53,000. Harmon turned down the bid, found his house legally condemned, and again went to court. Last February, he settled for $50,000, but the agreement was hardly amicable: Harmon wanted to purchase salvage rights to move his home to a new location, but the park manager sought the property for a ranger's residence. "Why can't my wife and I live in the house if a ranger can?" Harmon asks.

The elderly often suffer the most in a Park Service land-grab because they cannot afford to hire lawyers to defend their claims. Isaac Dunlap, almost eighty, lived in a modest retirement home he built himself near the Delaware River in Bushkill, Pennsylvania. In 1966, the Government began forcing out the first of 10,000 people who lived near the Delaware Water Gap to make way for the Tocks Island Dam—a mammoth public works project that would have carved out a reservoir thirty-seven miles long between New Jersey and Pennsylvania. But in 1978, the dam idea was dropped and the Park Service stepped in to transform the land—now blighted with abandoned farms—into a 70,000-acre national recreation area. Dunlap and his wife had the misfortune of living a few yards inside the border of the newly drawn park.

Dunlap worked out a deal to sell his home for $35,200 with the understanding that he could buy salvage rights. But Park Service officials later denied him those rights: they wanted the house for a ranger. Dunlap received the news on the evening of his seventy-ninth birthday. The next morning, his wife discovered a freshly written will by his empty bed and a thirty-two-caliber pistol missing from the bottom drawer of his bureau. It took twenty-four hours for the search party to find his body. His hand was still holding the gun.

Many of the residents shouldn't have been forced out. Since 1979, half a dozen reports from the U.S. General Accounting Office (GAO) have criticized Federal agencies for buying land "without adequate consideration of the impact on communities."

"The traditional attitude of the Park Service is that they're in the nature business, not the people business," says Joseph Sax, a University of Michigan law school professor who specializes in natural resources law. "When they get a park, they want to revert it to a natural state because it's easier to manage without people running around. They see people and parks as incompatible."

WHEN THE FIGLERS MOVED TO THE VALLEY, THEY THOUGHT THEY'D FOUND SHANGRI-LA. FOUR YEARS LATER, THE PARK SERVICE DECIDED TO TAKE OVER THEIR PROPERTY

The GAO notes that the new "recreation areas" were never meant to be grand wilderness preserves on the order of Yosemite National Park. Lacking such unique natural features as geysers or canyons, many of the areas are simply Federal playgrounds for nearby city-dwellers.

Yet park officials have often dismissed plans to work with existing communities, preferring quick buy-outs, GAO investigators found. Some homeowners who resisted were evicted through Declarations of Taking—the same condemnation method the Department of Transportation uses when building a new road through an inhabited area.

And when the victims of the land-grab tried to publicize their plight, they found that city newspapers supported proposed parks more than threatened homeowners. "The public has turned a deaf ear to the inholder," charges Senator Ted Stevens of Alaska, who has chaired hearings on land-acquisition abuses. "There's pressure from environmental groups to throw them off the land, while there's no justification for it. Parks can be created without destroying the individual rights of people who live in the parks."

The Park Service believes it is just carrying out its mandate. "To create open space, you may have to acquire private property," says Duncan Morrow, chief spokesman of the National Park Service in Washington, D.C. "And there's no good way to do it when someone's attached to their home. You can't compensate them for emotional value."

Michael J. Weiss is a free-lance writer in Washington, D.C.

Many environmentalists share the view hat the public good of preserving the wilerness often requires individual sacrices. "The Government interferes with ividuals all the time when it builds a ighway or a dam," says Tim Mahoney, Vashington representative of the Sierra Club. "Presumably, there is a choice that s made by representatives of the people hat the greater good, while clashing with ndividual rights, will have to take precedence."

Settled in the early Nineteenth Century by farmers and by laborers on the Ohio and Erie canals, the Cuyahoga Valley is a slice of rural Americana bordered by Cleveland to the north and Akron to the south. The descendants of those pioneers built sturdy wood-frame homes and, during the next 150 years, formed a handful of small valley communities known for their Yankee independence and Middle Western self-sufficiency.

"These were people who kept bees and raised their own herbs and made wine out of wild grapes," says Lily Fleder, who came to the valley in 1956. "The community was right out of a Norman Rockwell picture."

But in the late 1960s, pollution and commercial development began to threaten the valley. In 1969, the Cuyahoga River caught fire—the result of a burning oil slick—and environmentalists feared that metropolitan sprawl from the north and south would slowly smother the valley. In 1974, Ohio Representative John Seiberling proposed legislation to transform the valley into a 31,000-acre recreation area for the five million residents of northeastern Ohio. And though the Park Service Advisory Board opposed creation of a Federal Cuyahoga Preserve—"It didn't have the natural wonders of a Yosemite or Yellowstone," says Morrow—the plan was pushed through Congress.

Seiberling assured valley landowners that only "twenty-six to thirty homes" would have to be taken by the park; most of the 700 residences would be permitted to remain in the owners' hands for the rest of their lives. With that promise, local homeowners welcomed the idea of living inside a park.

But under the direction of Park Superintendent Bill Birdsell, acquisition agents began buying up house after house—bulldozing some, boarding up others, burning many as practical training for area firefighters. In some instances, the Government bought out the same people twice; owners sold their property and moved to new locations, only to discover the Park Service had changed its plans and now desired the new houses as well.

"Dealing with the Park Service is the most ruthless business in America," says Richard Fisher, mayor of the village of Peninsula, Ohio. "I'm sometimes asked why we didn't raise a lot of Cain when all this started. Well, we didn't think thirty houses was a big deal. But more than 300 houses sure is. We felt like we'd been sold a bill of goods."

When Al and Marylou Figler and their two young sons first came to the valley from Cleveland in 1971, they thought they'd found Shangri-la. They paid $40,000 for a 150-year-old, two-bedroom home on twenty-five wooded acres. But in 1975, the Figlers received a letter from the Park Service informing them of its intention to take over the property. "No reason given," says Marylou Figler. "They didn't have a plan for what they wanted with the property. They just wanted the land."

Government agents offered $89,000 for the Figlers' home and land, but the Figlers believed their property was worth far more than that. For five years, they resisted any settlement as the community around them dissolved. Neighbors moved out; their sons' baseball league disbanded for lack of players.

"It was aggravating having the Park Service people surveying our property all the time," recalls Figler. "You never knew when you would have to go."

One week shy of their tenth anniversary in the valley, the Figlers moved out. They left with $119,000 after hiring an attorney to work out a settlement, but even that could not dispel their bitterness. "The money wasn't what we were after," Figler explains. "We didn't want to move to some suburb where no one knows their neighbors."

THE PUBLIC'S QUEST TO RECREATE IN THE WILDERNESS HAS FUELED THE PARK SERVICE'S EFFORTS TO ACQUIRE LAND—EVEN IF IT MEANS EXTINGUISHING COMMUNITIES

Much early criticism of the Park Service was directed at Superintendent Birdsell, a career park administrator who came under fire for his heavy-handed tactics in ousting residents. Birdsell regularly arrived unannounced at private properties, measuring boundary lines or poking around garages. The Park Service replaced Birdsell in 1980 with a lower-profile administrator, Lewis Albert, also a career Park Service employee, who chose to focus his energies on buying large tracts of undeveloped land rather than single-family homes.

"The law calls us to create needed recreational open space," Albert explains from his office in the park. "At the same time, we're mandated to preserve the history and cultural institutions. That's a tough line to walk. Bill and I have both taken the position that non-historical properties which don't lend anything to the pastoral scene should be removed."

But leaders of the Cuyahoga Valley Homeowners Association dispute that interpretation. "The law did not say that the Park Service should buy a house just because you could see it from the road," says Association chairman Marty Griffith. "You shouldn't destroy someone's homestead just because you want to put a picnic table there."

The Homeowners Association filed a class-action suit in 1979, claiming the Park Service had acted illegally in acquiring homes without an expressed purpose for each property. Leonard Stein-Sapir, a wealthy attorney and homeowner representing the Association, championed the suit all the way to the U.S. Supreme Court. But in 1983, the high court declined to hear the case, ending any chance of redemption for the village community.

"We lost, not only for ourselves but everyone else in the country," says Stein-Sapir. "We weren't against the park, just the needless destruction of our community to make it."

As a result, the homes of the Figlers and hundreds of others today are gone. Local roads lead to boarded-up houses, the countryside is dotted with "For Sale" signs, and oddly manicured lawns persist on sites of recently demolished farmhouses. In Peninsula, the elementary school is closed and fewer kids show up to swim in the rock quarry each summer.

"It can't help but affect you to see your community slowly dying," says Randy Bergdorf, a twenty-two-year-old local librarian. "You lose your friends. You see perfectly good houses boarded up. And you wonder why the Park Service needed so much land so people could throw Frisbees."

Park administrators in Canada and Europe have found that people and nature can be compatible. France boasts twenty parks in which residents are as much a part of the scene as the local flora and fauna—parks designed to serve the dual function of protecting natural resources and preserving existing communities.

For instance, in France's Vosges du Nord regional park, the administration provides free architectural assistance to those who want to restore homes. Authorities at the Normandy-Maine regional park pay half the cost of planting pear and apple trees (used to make fruit liqueurs) on the condition that residents use traditional methods of cultivation. French officials allow paths to ramble through working farms and villages. The regional parks are not living museums but a reflection of human involvement with the natural setting.

Park officials in the United States, responding to bitter opposition to their land-buying practices, are finally beginning to adopt the cooperative strategies of their French counterparts. In Boxley Valley, a tiny village once slated for extinction in Arkansas's Buffalo National River Area, residents are being encouraged to develop tasteful "bed-and-breakfast" facilities rather than await the arrival of commercial motels and neon diners. The community applied last fall for placement in the National Register of Historic Properties and is given a good chance of surviving.

The Government is helping residents preserve and renovate their homes. Grazing and agriculture are regulated only to protect the water quality in the Buffalo River. Boxley Valley is an experiment in the right direction, a recreation area that takes community into account.

"There is nothing incongruous in having a few human settlements remain within a national park facility such as the Buffalo National River," says Joseph Sax. "The goal is to maintain the rivers and mountains as well as traditional life. It's taken a lot of time and effort, but the Park Service is finally learning to view people as assets rather than intrusions."

But the Park Service is learning too late for many residents of the Cuyahoga Valley. Though about 350 of the original 700 homes have been abandoned or destroyed, the National Recreation Area still awaits the planned hiking trails, bike paths, picnic facilities, and restored canal locks. Land purchases continue to outpace the Park Service's ability to develop and maintain the park.

No doubt, the public's long-time quest to recreate in untrammeled wilderness away from the crowded cityscape has fueled the Park Service's efforts to acquire land—even if it means extinguishing communities to make it uninhabited. Under such pressure, it's understandable that in the balance between a few individuals' rights and the greater public good, the Park Service has sided with the numbers. But what about the value of community?

Last spring, the Park Service began advertising for short-term tenants for the unoccupied homes whose residents were forced out by the Government. Leonard Stein-Sapir calls the move "the ultimate irony in the tragedy that was visited upon us." ■

STATEMENT OF EDGAR WAYBURN

CHAIRMAN, SIERRA CLUB ALASKA TASK FORCE

BEFORE THE

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

CONCERNING THE ARCTIC NATIONAL WILDLIFE REFUGE, OCTOBER 22, 1987

Mr. Chairman, members of the committee: my name is Edgar Wayburn. I am a physician and a conservationist with more than forty years of experience. I was President of the Sierra Club for five years and currently am a Director and Chairman of the Sierra Club's Alaska Task Force. During the past 21 years my wife and I have been to Alaska about 30 times. We have spent perhaps two years of our lives exploring this great state. I worked closely with the late great senator, Henry M. Jackson for ten years before the enactment of the Alaska National Interest Lands Conservation Act in 1980. At my urging, in 1973 and 1975, he introduced bills which called for the conservationists' plans for the setting aside of over 104 million acres of national interest lands in Alaska.

I have been to the Arctic National Wildlife Refuge several times. My family and I have floated the Canning and the Kongakut Rivers. I have experienced the warmth and the soft glow of the northern sun on a summer afternoon, and I have been drenched with the snow and sleet and rain from winter storms in July. I have climbed on the aufeis melting from the rivers in the late spring, and I have dried my frozen clothes over a small campfire. I can speak about the uniqueness of the Arctic National Wildlife Refuge.

And, as many others have said, the Arctic National Wildlife Refuge is unique in America. It is unique because of its own surpassing values. The interplay of life, of the vegetation and of the animals is in itself extraordinary. It is unique because there is no other place in the United States which still has such robust, intense, vital natural qualities. There is no place on the planet where the interplay of life is more fervent.

It is of unusual interest that the same Secretary of the Interior who is recommending that the coastal plain of the Arctic National Wildlife Refuge be exploited for oil exploration should be the first Secretary of the Interior to point out in detail mistakes made by his predecessor, Franklin Lane, some 75 years ago. In 1913, over the strenuous objections of John Muir and the

Sierra Club, Secretary Lane recommended to Congress that Hetch Hetchy Valley in Yosemite National Park be dammed to provide water and power for the city of San Francisco. Seventy-five years later, Secretary Donald Hodel rightly points out that this was a great mistake. He would like to take down the dam now and restore to the American people a valley as remarkable as Yosemite Valley. The proponents of O'Shaughnessy Dam in Hetch Hetchy had said, "We have one Yosemite Valley, and that is enough. A little altering, such as putting up a 430-foot high dam, will not change the beauty of the area. People will come to enjoy the pleasures of Hetch Hetchy Lake." Secretary Hodel sees that this premise was false.

But Secretary Hodel does not see that he would inflict a much greater disaster in Alaska by turning North America's last supreme wilderness over to industrial activity. Destroying the wilderness integrity of a large, untouched, undisturbed portion of our last and greatest national wildlife refuge could never be undone. Secretary Hodel's successors would have no way to repair for our descendants' benefit the damage he wants to do now. A pristine, wildlife-rich ecosystem, delicately balanced in its age-old adaptations to the severe Arctic conditions, could never be resurrected once oil - if any - is taken out and our descendants clamor for a return of beauty, of life, of nature. Secretary Hodel wants to perpetrate on the American people an irrevocable error.

The Arctic National Wildlife Refuge is not a simple ecosystem, entire in itself, but is part of a greater, international wilderness area--the caribou and the other wildlife encompass during their annual migrations a region that includes a substantial portion of northwestern Canada. The Canadians have recognized the value of preserving this wildlife haven across international borders, in their Arctic Yukon Preserve. But its integrity would be largely destroyed by industrial development in the essential Alaskan portion of the range.

The caribou and their migration are a symbol of the vast panoply of life which goes on in the Arctic. Although the Arctic National Wildlife Refuge is in itself essential to the United States and its citizens, we must recognize that the wholeness of the Arctic ecosystem reaches beyond our borders in its crucial importance to the world. At this juncture, when the message of world conservation is beginning to be so well recognized; when this Congress is telling United States agencies working in the international field to recognize the needs of the environment in its development projects--let us not retreat a giant step backwards in our own country.

I regret that a recent operation prevents me from presenting this statement in person. Thank you.

2618 NE 86th Street
Seattle, WA 98115
18 October 1987

The Honorable Bennett Johnston, Chairman
Energy and Natural Resources Committee
United States Senate
Washington, D.C. 20510

Dear sir,

I am writing to you because of your position as Chairman of the Energy and Natural Resources Committee to urge you to recommend passage of a Senate bill conferring wilderness status to the entire coastal plain of the Arctic National Wildlife Refuge. I am very familiar with the Refuge, having spent the greater part of six summers there and another just outside the Refuge to the west. Three of these trips were in the 1002 area. (see*)

1969 - hiking around Lake Schrader and ascent of Mt. Chamberlin with The Mountaineers. This group consisted of fourteen people, ranging from 13 to 72 years of age.
1970*- hike from Arctic Ocean coast to Lake Schrader. Three adults and three teens.
1971 - hike upper reaches of Sheenjek River and then kayak down to Fort Yukon. This party had three adults and one teenager.
1973 - hike around Elusive L. and then kayak down Ribdon and Sagavanirktok Rivers. This group consisted of three adults and one teenager.
1974 - hike upper Kongakut and then kayak north to Beaufort Sea and then along coast to Kaktovik. This group consisted of seven adults and one teenager.
1976*- hike across Brooks Range and kayak down Hulahula River to the coast and then to Kaktovik. This group consisted of six adults and two teenagers.
1978*- hike across Brooks Range and down Canning River to coast and then to Flaxman Island. The party on this expedition consisted of four adults and two teens.

Having seen the undeveloped coastal plain of the Refuge in comparison to the development at Deadhorse and Prudhoe Bay, I am convinced that permitting any oil exploration and drilling in the 1002 area will defeat the central purpose of that area, that of being a wildlife refuge. This area should be developed only as a last resort in the case of grave national emergency. Such an emergency does not exist now and with the development of a long-range national energy policy can be avoided.

Far more important than a risky development that might provide a small percentage of our country's projected oil demand for a few years after the turn of the century are the wildlife, recreational, and scientific values of the Refuge. There are other sources of oil such as the National Petroleum Reserve to the west. There is no other calving ground for the Porcupine caribou herd. We have seen caribou utilizing the plain from the edge of the pack ice to the foothills. This herd is the largest remaining in North America and in cooperation with the Canadians should be protected. Its annual migration is one of the finest wildlife spectacles remaining in North America. In 1974 we waited for a week at a likely pass to see the herd pass by. The day after we left thousands of caribou crossed. I would like to think we might have another chance to see this in a wilderness setting.

On another trip we saw the wary herd of musk oxen that were reintroduced to the Refuge years after the original musk oxen had been hunted to extinction. Even more threatened, however, are the predators. The only wolverine I have ever seen in the wild was on our hike inland from the coast in 1970. We have seen grizzlies chasing moose and wolves chasing caribou (all unsuccessfully from the predator's point of view). As was seen in the construction of the Trans-Alaska Pipeline, however, grizzlies that become accustomed to humans become a menace and usually are exterminated as a consequence.

The Arctic National Wildlife Refuge is the best part of the entire North Slope for recreation with its great variety of terrain, rivers for fishing and kayaking, and relatively narrow and dry coastal plain for hiking. All of my visits have included one or more high school students, and the arctic experience has taught them much. As a high school biology teacher, I still make use of my experiences and photographic slides in my classes. Other teachers also use my slides to illustrate the arctic ecosystem and such biological concepts as food chains.

As early as 1973 we saw oil spills associated with the early stages of development. Massive gravel removal from streams in the 1002 area would seriously damage recreational uses but would be done to build construction roads and drilling pads. In addition, inevitable water and air pollution as seen around Prudhoe Bay, traffic and construction noise, and permanent structures such as pipelines and roads would destroy the whole character of the coastal plain. Its value for wildlife and recreation would be seriously debased. Its value as an outdoor laboratory would be lost. One of the most inspiring memories of my life is that first night we spent camping on the gravel bar off the coast. The arctic pack ice formed the backdrop over which the midnight sun dipped orange. To the south in the soft night light we gazed for hours across the rolling green plain to the snowy Brooks Range; this was pristine nature at its best.

To have experienced the wilderness of the coastal plain of the Arctic National Wildlife Refuge several times and to have seen the contrasting industrialized area of Prudhoe Bay requires me to urge you to give full protection to the entire coastal plain of the Refuge.

Sincerely yours,

Ken Davis

Ken Davis

are bound together within it, and the feeling that this is the floor of creation.

THREE of us were driving north on the trans-Alaska pipeline haul road, pulling a boat behind a pickup. For miles at a time we were the only vehicle, then a tractor-trailer truck—pugnacious and hell-bent—would shoulder past, flailing us with gravel. From Fairbanks to Prudhoe Bay the road parallels the elevated, gleaming pipeline. Both pathways in the corridor have a manicured, unnatural stillness about them, like white-board fences running over the hills of a summer pasture. One evening we passed a lone seed-and-fertilizing operation, spraying grass seed and nutrients on the slopes and berms of the road, to prevent erosion. There would be no unruly tundra here. These were the seeds of neat Kentucky grasses.

One day we had a flat tire. Two of us changed it while the third stood by with a loaded .308 and a close eye on a female grizzly and her yearling cub, rooting in a willow swale 30 yards away. We saw a single wolf—a few biologists in Fairbanks had asked us to watch for them. The truckers, they said, had shot most of the wolves along the road; perhaps a few were drifting back in, with the traffic so light now. Short-eared owls flew up as we drove along. Single caribou bulls trotted off in their light-footed way, like shy waterfowl. Moose standing along the Sagavanirktok River were nodding in the willow browse. And red foxes, with their long black legs, pranced down the road ahead of us, heads thrown back over their shoulders. That night I thought about the animals, and how the road had come up amidst them.

We arrived at the oil fields at Prudhoe Bay on an afternoon when light blazed on the tundra and swans were gliding serenely in rectangles of water between the road dikes. But this landscape was more austere than any I had ever seen in the Arctic. Small buildings, one or two together at a time, stood on the horizon. It reminded me of West Texas, land throttled for water and oil.

Muscular equipment sitting idle like slouched fists in oil-stained yards. It was no business of mine. I was only here to stay overnight. In the morning we would put the boat in the water and head west to the Jones Islands.

The bungalow camp we stayed in was wretched with the hopes of cheap wealth, with the pallid, worn-out flesh and swollen bellies of supervisors in ball caps, and full of the desire of young men for women with impossible shapes; for a winning poker hand; a night with a bottle gone undetected. The older men, mumbling of their debts, picking through the sweepings of their despair alone in the cafeteria, might well not have lived through the misery, to hear the young men talk of wealth only a fool would miss out on.

We left in the morning, bound for another world entirely, the world of science, a gathering of data for calculations and consultations that would send these men to yet some other site, the deceit intact.

Months later, on a cold March morning, I came to Prudhoe Bay for an official visit. I was met at the airport by a young and courteous public relations officer, who shook hands earnestly and gave me the first of several badges to wear as we drove around the complex. The police at road checkpoints and at building entrances examined these credentials and then smiled without meaning to be cordial. Here was the familiar chill of one's dignity resting for a moment in the hand of an authority of artificial size, knowing it might be set aside like a small stone for further scrutiny if you revealed impatience or bemusement. Industrial spying, it was apologetically explained—disgruntled former employees; the possibility of drug traffic; or environmental saboteurs.

We drove out along the edge of the sea ice and examined a near-shore drill rig from a distance—too chilly to walk over, said my host, as though our distant view met the letter of his and my responsibilities.

We ate lunch in the cafeteria of the oil company's headquarters building, a sky-lit atrium of patrician silences, of slacks and perfume and well-mannered people, of plants in deferential attendance. The food was perfectly prepared. (I recalled the low-ceilinged cafeterias with their thread-bare, food-stained carpets, the cigarette-burned tables, the sluggish food and clatter of Melmac where the others ate.)

On the way to Gathering Station #1 we pull over, to be passed by the largest truckload of anything I have ever seen: a building on a trailer headed for the Kuparuk River. In the ditch by the road lies a freshly fallen crane, the wheels of the cab still turning in the sunshine. The man with me smiles. It is −28°F.

At Gathering Station #1 the oil from four well areas is cooled. Water is removed. Gas is separated off. Above ground for the first time, the primal fluid moves quickly through pipes at military angles and sits under pressure in tanks with gleaming, spartan dials. The painted concrete floors are spotless. There is no stray tool or wipe rag. Anything that threatens harm or only to fray clothing is padded, covered. The brightly lit pastel rooms carry heat from deep in the earth and lead to each other like a series of airlocks, or boiler rooms in the bowels of an enormous ship. I see no one. The human presence is in the logic of the machinery, the control of the unrefined oil, the wild liquid in the grid of pipes. There is nothing here for the oil but to follow instructions.

Tempered, it flows to Pump Station #1.

The pavilion outside the fence at the pump station is drifted in with snow. No one comes here, not in this season. I climb over the drifts and wipe wind-crusted snow from Plexiglas-covered panels that enumerate the local plants and animals. The sentences are pleasant, meant to offend no one. Everything—animals, oil, destiny—is made to seem to fit somewhat naturally together. People are not mentioned. I look up at Pump Station #1, past the cyclone fencing and barbed wire. The slogging pumps sequestered within insulated buildings on the tundra, the fields of pipe, the roughshod trucks, all the muscular engineering, the Viking bellows that draws and gathers and directs—that it all runs to the head of this seemingly innocent pipe, lined out like a stainless-steel thread toward the indifferent Brooks Range, that it is all reduced to the southward journey of this 48-inch pipe, seems impossible.

No toil, no wildness shows. It could not seem to the chaperoned visitor more composed, inoffensive, or civilized.

None of the proportions are familiar. I stand in the windblown pavilion looking at the near and distant buildings. I remember a similiar view of the launch complexes at Cape Canaveral. It is not just the outsize equipment lumbering down the roads here but the exaggerated presence of threat, hidden enemies. My face is beginning to freeze. The man in the blue Chevrolet van with the heaters blasting is smiling. No guide could be more pleasant. It is time to eat again—I think that is what he is saying. I look back at the pipeline, this final polished extrusion of all the engineering. There are so few people here, I keep thinking. Deep in the holds of those impersonal buildings, the only biology is the dark Devonian fluid in the pipes.

On the way back to the cafeteria the man asks me what I think of the oil industry. He has tried not to seem prying, but this is the third time he has asked. I speak slowly. "I do not know anything about the oil industry. I am interested mostly in the landscape, why we come here and what we see. I am not a business analyst, an economist, a social planner. The engineering is astounding. The true cost, I think, must be unknown."

During dinner he tells me a story. A few years ago there were three birch trees in an atrium in the building's lobby. In September their leaves turned yellow and curled over. Then they just hung there, because the air in the enclosure was too still. No wind. Fall came when a man from building maintenance went in and shook the trees.

Before we drove the few miles over to Deadhorse, the Prudhoe Bay airport, my host said he wanted me to see the rest of the Base Operations Building. A movie theater with tiered rows of plush red velour seats. Electronic game rooms. Wide-screen television alcoves. Pool tables. Weight-lifting room. Swimming pool.

Squash courts. Running track. More television alcoves. Whirlpool treatment and massage. The temperatures in the different rooms are different perfectly. Everything is cushioned, carpeted, padded. There are no unpleasant sounds. No blemishes. You do not have to pay for anything. He shows me his rooms.

Later we are standing at a railing, looking out through insulated glass at the blue evening on the tundra. I thank him for the tour. We have enjoyed each other. I marvel at the expense, at all the amenities that are offered. He is looking at the snow. "Golden handcuffs." That is all he says with his wry smile.

IT is hard to travel in the Arctic and not encounter industrial development. Too many lines of logistic support, transportation, and communication pass through these sites. I passed through Prudhoe Bay four or five times in the course of several years, and visited both lead-zinc mines in the Canadian Archipelago, the Nanisivik Mine on Strathcona Sound on Baffin Island, and the Polaris Mine on Little Cornwallis Island. And one winter I toured Panarctic's facilities at Rae Point on Melville Island, and their drill rigs on the sea ice off Mackenzie King and Lougheed islands.

I was drawn to all these places for reasons I cannot fully articulate. For the most part, my feelings were what they had been at Prudhoe Bay—a mixture of fascination at the sophistication of the technology; sadness born out of the dismalness of life for many of the men employed here, which no amount of red velour, free arcade games, and open snack bars can erase; and misgiving at the sullen, dismissive attitude taken toward the land, the violent way in which it is addressed. At pretensions to a knowledge of the Arctic, drawn from the perusal of a public relations pamphlet and from the pages of pulp novels. A supervisor at an isolated drill rig smiled sardonically when I asked him if men ever walked away from the buildings on their off-hours. "You can count the people who care about what's out there on the fingers of one hand." The remark represents fairly the situation at most military and industrial sites in the Arctic.

Away from the carefully tended environment of a corporate showcase base of operations, the industrial scene is much bleaker. In the most distant camps, to my sensibilities at least, were some of the saddest human lives I have ever known. The society is all male. The tedium of schedules is unrelieved. Drugs and alcohol are smuggled in. Pornographic magazines abound, which seems neither here nor there until one realizes that they are nearly inescapable, and that they are part of a resentful attitude toward the responsibilities of family life. There is a distrust, a cursing of women, that is unsettling. Woman and machinery and the land are all spoken of in the same way—seduction, domestication, domination, control. This observation represents no new insight, of course, into the psychology of development in Western culture; but it is not academic. It is as real as the scars on the faces of flight attendants I interviewed in Alaska who were physically and sexually abused by frustrated workmen flying to and from Prudhoe Bay.

The atmosphere in some of the camps is little different from the environment of a small state prison, down to the existence of racial cliques. This is part of factory life in America, an ugly way the country has arranged itself, a predicament from which economic and political visionaries would extricate us. There is a lurking suspicion among the workers I spoke to that in spite of their good wages they were somehow being cheated, that any chance for advancement from their menial situation was, for most of them, an illusion. And they were convinced that someone, somewhere, was to blame. Their frustration was predictably directed at their employers, at overeducated engineers or petroleum geologists, and at vague political and ethnic groups whom they saw as confused and impractical critics of growth, of progress. Some of these men felt that the Arctic was really a great wasteland "with a few stupid birds," too vast to be hurt. Whatever strong men could accomplish against the elements in such a place, they insisted, was inherently right. The last words of many of these discussions, whether they were delivered quizzically or cynically or in disbelief, were summary—what else is it good for?

Many arctic oil and mine workers are hard-pressed to explain—and mostly not interested in—what it is good for, beyond what is in the ground; or in what its future will be; or in the fate of its people and animals. "Technology is inevitable," a drilling supervisor told me with finality one day. "People just got to get that through their heads." The sensibility of many of the foremen and crew chiefs, to characterize the extreme, is colonial. The tone of voice is impatient and the vocabulary is economic. The mentality is largely innocent of history and arctic ecology, cavalier about human psychological requirements, and manipulative. And the attitude of the extremist, at least in this regard, filters down. These thoughts are parroted by other workers who feel defensive, or embattled by critics. Men who make such extreme statements often give the impression of not having thought through what they are saying. They only mean to keep their jobs, or talk themselves out of doubt.

In the mines and oil fields, of course, were other, different men, who criticized in private conversation what was being done "for the money." As a group, they felt a responsibility for what they were doing. They did not see their jobs solely as a source of income. Many told me they wanted to return to the Arctic after making enough money to go back to school. They wanted to travel in the Arctic and read more about it. They meant no harm, and were uneasy themselves about the damage they were capable of doing. In Canada they feared the collusive force that government and industry were capable of bringing to bear—that the restraints against it were too weak. These were mostly younger men; and the sentiments were not rare among them.

More memorable somehow, and ultimately more gratifying, were the thoughts of several older men who spoke to me on different occasions about the conditions under which they worked. (It was one of them who had suggested the parallel with prison life.) These were seasoned men of dignified bearing in their forties and fifties, the sort of people you have regard for instantly, regardless of the circumstances. They were neither insistent nor opinionated in offering their observations, which made it easier to speculate in their presence; and they gave an impression of deliberation and self-knowledge.

They shook their heads over industrial mismanagement, that humorless, deskbound ignorance that brings people and land together in such a way that both the land and the people suffer. They said, without any condescension, that the companies that employed them sometimes clearly erred, and that they acted in high-handed and sometimes illegal ways. But these were more acknowledgments of a state of affairs than criticism. They spoke as much of their families, of their wives and children. They spoke of them with indulgence and unconscious admiration. You could build anything on the decency of such men.

In the wake of these latter conversations the world seemed on balance to me, or at least well intentioned. Part of what was attractive about these men was that their concern for the health of the land and their concern for the fate of people were not separate issues. They were not for me, either. And one evening, lying in my bunk, it became clear that the fate of each was hinged on the same thing, on the source of their dignity, on whether it was innate or not.

The source of their dignity—not among themselves, but in a larger social context—was the approval of their superiors, an assessment made by people who were not their peers. (Largely unfamiliar with modern Eskimo life, these men nevertheless had an intuitive and sympathetic response to the predicament of Eskimos constantly being scrutinized and judged by outsiders.) Their dignity as workmen, and therefore their self-respect, was not whole. To an outside viewer they, like the land, were subject to manipulation. Their dignity was received. It grew out of how well they responded to directions.

In my experience, most people in the Arctic who direct the activities of employees or who seek to streamline the process of resource extraction without regard to what harm might be done to the land, do so with the idea that their goals are desirable and admirable, and that they are shared by everyone. Their own source of dignity, in fact, derives from a belief that they are working in this way "for the common good." In their view the working man must provide cheerful labor, be punctual, and demonstrate allegiance to a concept of a greater good orchestrated from above. The Eskimo, for his part, must conduct himself either as a sober and aspiring middle-class wage earner or, alternately, as an "authentic, traditional Eskimo," that is, according to an idealized and unrealistic caricature created by the outsider. The land, the very ground itself, the plants and the animals, must also produce something—petroleum, medicines, food, the setting for a movie—if it is to achieve any measure of dignity. If it does not, it is waste. Tundra wasteland. A waste of time.

Without dignity, of course, people are powerless. Strip a person or the land of dignity and you can direct any scheme you wish against them or it, with impunity and with the best of motives. To some this kind of efficiency is a modern technique, lamentable but not evil. For others it is a debilitating degradation, a loss of integrity and spirit that no kind of economic well-being can ever justify.

The solution to this very old and disconcerting situation among the men I spoke to, when I asked, was utopian. They believed in the will of good people. They thought some way could be found to take life-affecting decisions away from ignorant, venal, and unimaginative persons. Yes, they said, an innate not a tendered dignity put individuals in the best position to act, to think through the difficult problems of what to do about technologies that mangled people and mangled the land. But they did not know where you started, where the first, hard changes had to be made.

I was traveling with a friend once, in northern Baffin Island. We were in a hunting camp at the edge of the sea ice with about thirty Eskimos. It was damp and windy—raw weather. Out of the sky one morning—we had been in this atmosphere long enough to make the event seem slightly confusing at first—came a helicopter, which landed at the camp. A man got out and walked

Washington Wilderness Coalition

P.O. Box 45187, Seattle, WA 98145-0187 (206) 633-1992

14 October 1987

Honorable Bennett Johnston, Chairman
Energy and Natural Resources Committee
U.S. Senate
Washington, D.C. 20510

Dear Senator Johnston: RE: ANWR

The Washington Wilderness Coalition (WWC) is composed of 35 groups and over 1000 individual members who share a concern for wilderness, wildlife, rivers and natural resource conservation. While the main focus of the WWC has been on Washington State matters since the organization's inception in 1979, our membership has demonstrated its interest in and concern about the issues affecting other federal lands across the country.

The lure of Alaska continues to fascinate people who live in Washington State. Due to our relative proximity to Alaska, many Washington State residents have traveled to Alaska. For example, major journeys or wilderness expeditions have been made to Alaska by one-third of the Directors on our Board and one of our three staff members. In part because Seattle has been the "jumping off point" to Alaska for over a century, and in part because Alaska represents vast, untouched wild country, our membership has continued to show a keen interest in the lands preservation issues of Alaska throughout our history as an organization.

The Arctic National Wildlife Refuge (ANWR) in northeastern Alaska is not only of interest to our membership, this area is of international significance. The annual migration of the Porcupine caribou herd between the Porcupine River in Canada and the north slope of the ANWR is one of the true wildlife wonders on the North American continent. It is an incredible story of the perseverance of 180,000 animals, as they cross several hundred miles of difficult terrain and ford treacherous, icy rivers to reach their ancient calving grounds on the north slope of ANWR. The Department of the Interior estimates that oil and gas development would result in a 20-40% reduction in the caribou.

The bird migrations to the north slope are no less spectacular. Birds such as the snowy owl, black brant, and snow goose, and many other ducks, geese, loons, and shorebirds which winter in Washington fly to the 1002 area each spring to breed and raise their young or to stage during molting and fall migration, following breeding in adjacent areas. Development would have a negative impact on many of these critical life activities of these birds. The lesser snow goose population alone could decline by as much as 50%.

The predators which prey on the caribou and other smaller animals are in extreme danger if the caribou herd is diminished by 20-40%. What does a "moderate decline" mean on the wolf population, which currently numbers less than 10 animals, or on the grizzly bear population, which is also quite limited? Both species have declined severely in the Prudhoe Bay area following oil development.

According to the Department of Interior study, the effects on the endangered polar bear are unknown. Evidence from Prudhoe Bay, however, shows that polar bears have been totally eliminated from the vicinity since oil was discovered. Musk oxen also would be displaced from 71% of their preferred habitat, which would affect up to one-half of the population.

In addition to a complete disruption of the ecosystem of the northern portion of ANWR, oil and gas exploration and development would result in significant deterioration in air quality, oil spills, major accumulations of toxic wastes, and destruction of the scenic quality of the vast tundra vistas. Each oil well drilled would require fifteen million gallons of fresh water. Finding enough fresh water to allow for drilling would further endanger wildlife and fish during the critical winter months when unfrozen water supplies are very limited.

Because of the serious degradation which would result from oil and gas exploration and drilling, the Washington Wilderness Coalition is strongly opposed to Senator Murkowski's bill, S. 1217, which would open up the Arctic National Wildlife Refuge to oil and gas leasing and development.

Since exploration would result in many of the same impacts as full-scale development, we also are gravely concerned about a "compromise" which the Committee may try to work out. There is no such thing as "having our cake and eating it too" on this issue. Development would result in the destruction of the wilderness on the north slope of ANWR. It is not possible to have "limited development" on the arctic slope without destroying the wilderness and the wildlife which depend on that wilderness.

Especially since the United States does not even have a national energy policy, we cannot condone the sacrifice of this prime wilderness for the speculative gain of a possible 200 days worth of oil. It does not make sense to squander what we do have readily available in this country by increasing the speed limit and other wasteful practices. Nor does it make sense to rob the programs which could encourage the development of alternative energy sources and promote conservation measures. Finally, with all the talk about the necessity to drill for oil to protect our national security, why does the State of Alaska propose to ship the oil, if oil is discovered in ANWR, to Japan? We believe that the national security argument is nothing more than a smoke screen to raise the level of hysteria so that pressure is brought to bear on opening up this area.

The Washington Wilderness Coalition strongly supports immediate designation of the 1002 area of the Arctic National Wildlife Refuge as wilderness. If we cannot protect the wilderness in this remote corner of America, it is unlikely that we will ultimately be able to protect it anywhere.

We request that this letter be included in the hearing record on the Arctic National Wildlife Refuge.

Thank you very much.

Sincerely,

Skip Nichols

Skip Nichols, President
Walla Walla, Washington

FEDERATION OF WESTERN OUTDOOR CLUBS

Established for Mutual Service and for the Promotion of the Proper Use, Enjoyment and
Protection of America's Scenic, Wilderness and Outdoor Recreation Resources
1987–1988

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Washington D.C. Representative:
Brock Evans
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Northwest Representative:
Jim Blomquist
1516 Melrose Ave
Seattle, Wa 98122

October 15, 1987

Senator Bennett Johnston
Chairman Eneragy and Natural Resources Committee
Senate Building,
Washington, D. C. 20510

Dear Senator Johnston:

This is to advise you that at the 56th Convention of the Frederation of Western Outdoor Clubs, held August 24-26 in San Francisco, the following resolution was passed unanimously:

ARCTIC NATIONAL WILDLIFE REFUGE

The Arctic National Wildlife Refuge was created to ensure a place where the wildlife of the northeastern part of Alaska would have an undisturbed environment for the future.

Now the oil industry has asked for permission to drill for oil in the refuge. Representatives of this industry claim that only 12,000 acres of the refuge will be disturbed; however, this figure only includes the land which physically will be covered with roads, buildings, pipelines and drill pads. Not mentioned is the land impacted by pollution from the reserve pits which contain cuttings, discharges from drilling operation, hydrocarbons, lignosulfanate, metals and other toxic pollutants. Reserve pits are of gravel dike construction and are left uncovered and unlined.

In 1985 SOHIO Alaska Production Company averaged four million gallons of discharged water per pit which was dumped on tundra and roadways. There are now approximately three hundred pits on the North Slope of the Brooks Range.

If oil is discovered within the refuge, 12000 acres would be only the beginning of the intrustion. Prudhoe Bay has not been the shining example of cleanliness the oil industry portrays. There have been many more oil spills than have been reported. Air pollution monitoring started in 1979 and violations frequently have occurred.

Representative Morris K. Udall has introduced HR 39 which would designate the coastal plain of the refuge as wilderness.

The Federation of Western Outdoor Clubs asked that the House Interior and Insular Affairs Committee and the Senate Energy and Natural Resources Committee recommend that HR 39 be passed as written.

The Federation of Western Outdoor Clubs is a coalition of 46 recreational and conservation organizations, from eight western states, with an aggregate membership of over a quarter of a million.

Sincerely,

Jack Walker

Jack Walker
President

512 Boylston Ave. E. #106
Seattle, Wa. 98102
October 15, 1987

Senator Bennett Johnston
Chairman Energy & Natural Resources Committee
Senate Building
Washington, D.C. 20510

Dear Senator Johnston:

One of the arguments frequently made by opponents to having the Arctic National Wildlife Refuge designated a wilderness is that environmentalists want this classification simply for their own selfish recreational interests. They further argue that in that remote land only the strong and vigorous young could endure the hardships of hiking there; also that only the rich could afford the expense of getting there.

This is not true, as I can personally attest. I have made several trips with groups to Alaska. One was to the Arctic National Wildlife Refuge where we camped at Schraeder Lake in the foothills of the north slope of the Brooks Range. I was 78 years old at the time, and, further, I managed to save enough from my modest pension to finance the venture.

Altogether that year, in four separate groups some 20 people camped at the Lake. Most were in modest circumstances, and more than half of them were 65 years and older.

It was a never-to-be-forgotten experience. We saw the small Arctic grizzly with cubs, many caribou, foxes, a herd of musk oxen and many small mammals. We also saw ground-nesting long-tailed jaegers, Arctic loons, snowy owls, numerous small birds, all which breed and rear their young only in the far north. The area has a carpet of wildflowers, mosses and lichen.

This tundra is extremely delicate and we camped with caution, moving our location frequently. Drilling for oil along any part of this northern land would have a devasting effect on the environment and the flora and fauna which it supports.

Sincerely,
Hazel A Wolf
Hazel A. Wolf

5119 1/2--27th N.E.
Seattle, WA 98105
October 18, 1987

Hon. Bennett Johnston, Chairman
Energy and Natural Resources Committee
U.S. Senate
Washington, D.C. 20510

Dear Senator Johnston: RE: Arctic NWR

For thirteen years, I have been involved with wilderness guiding in Alaska during part or all of the summer. I have personally led or assisted on trips on the north slope of the Arctic National Wildlife Refuge (ANWR) in the following locations: Sadlerochit Mountains, Schrader and Peters Lakes, Hula Hula River, Jago River, and Clarence River. The trips included hiking trips, base camp trips, or combination hiking/base camp trips. I also have assisted on a kayaking trip on the Sheenjek River, which is on the south slope of ANWR, and have led or co-led hiking and kayaking trips in other parts of the Brooks Range and in Southeast Alaska.

Many of the people on my trips have been older people, a majority near or past retirement age. One woman on one of our base camp trips was close to eighty; a number of people have been in their seventies. Some people have been seasoned wilderness travelers, while others have been novices. One couple in their late sixties came to ANWR for the first backpacking trips of their lives.

The people on these trips have been from all walks of life and from all parts of the United States. They have come to experience the wondrous wildlife spectacle of northern Alaska. They have come to escape the rapid pace of the modern world by stepping into the timelessness of true wilderness. They have come to reunite with a primordial essence of their very being, to view themselves as a part of something greater than themselves. They have come to challenge and test themselves. They have come to be healed from the wounds of our time. It is clear that people come to ANWR for a variety of reasons, but they all share the desire to see and to become a part of the vast wilderness of Alaska.

In my third summer in Alaska, I saw my first wolf -- on the north slope of ANWR. I had gone up to Alaska that summer very hopeful that I would have the chance to see a wolf, which to me symbolizes the very essence of real wilderness. The trip that I had been leading had been very successful for wildlife -- with caribou everywhere -- and wildflowers in profusion. But, despite my frequent wanderings along the gravelbars, hoping to see a wolf that would be following the caribou, there were no wolves to be found. I was very disappointed as the trip came to an end without our catching even a glimpse of a wolf.

Upon my arrival back into the native village of Kaktovik after the trip, however, I was given an opportunity -- which I promptly accepted -- to fly back into a camp which had been set up by a couple of my friends. One morning, in the midst of breakfast, a month-old caribou calf came streaking through camp, its eyes wild with terror. Hot in pursuit was a big, white wolf. As the caribou crashed through the brush behind our camp and escaped, the wolf screeched to a halt about 150 yards from us and began to eye the human intruders with curiosity. We stood mesmerized by the wolf and gazed fully into the yellow eyes of this magnificent animal. He watched us carefully, trotted slowly to one side of the camp, stopped again to observe us a couple of times, then trotted on up the hill behind our camp.

My first wolf sighting was an experience of a lifetime, one that I shall never forget. Needless to say, I was thrilled not only by finally seeing a wolf in the wild, but also by seeing him in the midst of his life's activities.

There are few places left on this earth where one has an opportunity to see wildlife in such a wild, undisturbed setting as in the Arctic National Wildlife Refuge. Over the summers, I have seen caribou, grizzlies, musk oxen, moose, and arctic foxes. I have observed the courting displays of birds and watched the young birds as they are being trained to survive. On the tundra, where the birds nest directly on the ground, one must walk carefully. Many times I have been startled by the sudden fluttering of wings as a parent seems to appear out of the ground to lead intruders away from its nest or nestlings, which are well hidden from view.

If oil and gas exploration or drilling were allowed in ANWR, all of this would change -- the caribou and many of the species of birds would suffer severe population declines; the wolves, grizzlies and musk oxen would disappear; and the wilderness would be destroyed forever.

On a number of occasions, I have sat on the tundra of the north slope and looked north to the Beaufort Sea. Clearly visible from many points on the north slope are the two huge disks of the Barter Island Dew Line Site. The site makes quite a visual impact, even far inland. If allowed to proceed with oil development, the drilling rigs, roads, dust, buildings, noise, pipelines, processing facilities, etc., would be an intolerable intrusion because they would be visible everywhere on the north slope.

We are not so energy-poor in this country that we must sacrifice this crown jewel of the National Wildlife Refuge system for the low probability that we might find a few months' worth of oil. If we are that close to the bottom of the barrel, we need to make immediate changes in our consumption patterns and work strongly to improve conservation and efficiency standards.

ANWR should be one of the very last places in this country that we even look for oil. Rather than draining American first, why are we not working to develop renewable energy sources, such as wind and solar power? Why are the oil companies capping oil wells in other parts of the country that are unprofitable to drill at this time while looking with greedy eyes at an area which would be very expensive to develop? The United States needs a sound energy policy that encorporates a variety of sources of energy, eventually weaning us of our dependence on oil.

It is my experience that the Arctic National Wildlife Refuge is one of the premier wilderness areas we have left in the world. It is unquestionably wild, unquestionably pristine. It would be a tragedy to allow oil and gas exploration or drilling to mar the north slope of the ANWR.

I support immediate wilderness designation for the 1002 portion of the Arctic National Wildlife Refuge, for this area is truly wilderness and deserving of the protection such status would provide. I am strongly opposed to Senator Murkowski's bill, S. 1217, to open up the 1002 area to immediate oil and gas drilling, or to any so-called compromise, which would eventually lead to full-scale development. Even limited drilling would drastically change the character of this wild land and disrupt the wildlife so dependent on wilderness for its survival.

I respectfully request that this statement to included in the hearing record on the Arctic National Wildlife Refuge. Thank you very much.

Sincerely yours,

Karen M. Fant

Karen M. Fant

22910 102nd Place West
Edmonds, Washington 98020
Phone: 206-776-4896
October 19, 1987

The Honorable Bennett Johnston
Chairman: Energy and Natural Resources Committee
United States Senate
Washington, D.C. 20510

Dear Sir:

As one who has personally experienced the National Arctic Wildlife Refuge, I urge you to save this magnificent wilderness ecosystem for future generations, and not to risk its degradation for the sake of a few more years of petroleum addiction.

During the summer of 1970 I hiked with a group of six friends, including three teen-aged boys and my wife, from Camden Bay on the Beaufort Sea, across the North Slope and the Sadlerochit Mountains to Lakes Schrader-Peters in the Brooks Range. We also explored the Hulahula Valley and numerous side valleys. We carried all our food and equipment for 28 days on our backs.

This was the greatest wilderness experience of my life. After 17 years the memories of incredible vastness and prolific wildlife remain vivid. We arrived on the North Slope soon after the calving of the Porcupine caribou herd, and walked for days among groups of cows and young calves. Later we passed a nearly steady stream of males with black velvet on their antlers. We saw wolves, wolverine, fox, grizzly, dall sheep, and many species of nesting birds. The slides I took on this trip are used every year in high school biology classes to illustrate a natural, undisturbed ecosystem.

The highest and best value of this place is as a calving ground and wildlife refuge. A few more years' supply of petroleum to feed our insatiable demand cannot save us. Only a sane, long-term energy policy emphasizing renewable, non-polluting energy sources can maintain civilization through the 21st century. Your committee could provide the leadership our nation needs to begin breaking our fatal petroleum-burning addiction.

-- OVER --

Can civilization hope to survive the burning of our last petroleum resources? Can we survive a 6 -7 degree rise in average global temperature from the CO_2 greenhouse effect? Can we survive the air pollution resulting from all this combustion? If we burn up the last of our petroleum, then we can never use it for building such valuable things as polymers, pharmaceuticals, and even electrolytic membranes to efficiently produce hydrogen fuel from water using solar energy.

Can the human spirit survive the loss of earth's last intact ecosystems? I hope we do not have to find out! I hope that my children and great-grandchildren will be able to experience the great living land of the National Arctic Wildlife Refuge, as I have been privileged to experience it.

Thank you for you consideration.

Sincerely,

Stephen P. Burger

Stephen P. Burger

22910 102nd Place West
Edmonds, Washington 98020
October 7, 1987

The Honorable Bennett Johnston
Chairman of the Energy and Natural Resources Committee
United States Senate
Washington, D.C., 20510

Dear Sir:

I strongly favor the preservation of the Arctic National Wildlife Range as it is now. I equally strongly oppose oil exploration and development in that area.

In the summer of 1970 I hiked in the Arctic National Wildlife Range for 29 days. Our wilderness adventure began when our bush pilot landed on the sandy beach of the Beaufort Sea. We were welcomed to the area by an arctic fox sitting on the beach and a flock of trumpeter swans who were building nests at this northern most marsh of their migratory path.

Six of us hiked for the next 4 weeks across tundra teaming with birds, caribou and their calves, wolves, wolverines, dall sheep, and grizzly bears. I felt a kinship with the early pioneer women. When I looked for miles across completely unspoiled tundra to distant mountains, I sensed the adventerous spirit that must have called our forefathers to come west. I could spend an entire day in the silence of nature, walk on ground where no human had left his mark, breathe unpolluted air and know in what magnificent beauty the Creator originally designed this planet. I dreamt of the day I could return to this pristine wilderness with my children.

We have destroyed so much of our planet because of our desire for material comfort. It makes much more sense to search for pollution-free energy alternatives than to continue our dependence on oil. The carbon monoxide and dioxide by-products of burning this fuel contribute drastically to the greenhouse effect. The resulting warming trend is well-documented by meteorologists. The nitrous oxide by-product of combustion contributes to ozone depletion.

Long-range dependence on oil does not make environmental sense. To explore this wilderness area for oil seems to me to be a travesty. Please preserve this vestige of nature's harmony as it is.

Thank you very much.

Sincerely,

Virginia P. Burger

1611 Calhoun St.
Seattle, WA 98112
October 19, 1987

Senate Committee on Energy
and Natural Resources
United States Senate
Washington, D.C. 20510

RE: Proposed oil drilling in the Arctic Wildlife Refuge

Dear Mr. Chairman and Members:

I have recently returned from a month long (June, 1987) vacation during which Stephen Jones and I hiked and river floated in the Arctic Wildlife Refuge. Although I am an experienced hiker and backcountry traveler, I found this trip to be a profoundly moving experience; taken in its totality it was the most outstanding I have ever been on! The Brooks Range is sensational. In addition during our trip, we saw approximately 4000 caribou in migration, 300-400 Dall sheep, and 3 musk oxen often at close range 20-100 feet away. In fact, we had an intensely personal meeting at about 10 feet with a Dall ram we named "Curious George." He just wanted to check us out so we subsequently stared at one another from this distance for some 15 minutes. We thought we could detect a twinkle of ammusement in his eye as he observed the "aliens." All in all we traveled about 150 miles on foot and by raft during our trip which covered the Leffingwell fork of the Aichilik River and the Kongakut River subsequently. Because of this I feel my observations may be of interest to you as congress engages in the debate to determine whether oil and gas exploration will be permitted in the refuge.

The lack of interference by man or other extraneous influences makes it possible to observe at first hand the complex ecology of the area. For example, the caribou migration routes are clearly marked by the bones of the young and the aged which have fallen prey to wolves and other predators. We often climbed peaks in the Brooks Range as day hikes. On one particularly memorable "midnight sun" hike near Caribou Pass on the Kongkut Tiver, we sat on a ridge at 2 am and saw many caribou as dots on the coastal plain. Another day we were able to observe a musk ox at close range on the edge of the coastal plain. It seems ironic to me that after being butchered to extinction by whalers in the 1860's, and nurtured back over 50 years by a breeding program with 30 seed animals from Greenland, that we are on the brink of extinguishing them again.

As "Alaska Geographic" (vol. 8, #4, p12) stated in 1981, "The Alaska d-2 lands bill breaks new ground in a number of ways. A deliberate effort was made to include entire ecosystems in protected status."

I believe that any proposals to drill for oil and gas in the coastal plain of the refuge strike at the heart of this concept. Entire ecosystems cannot be preserved with oil and gas equipment in the middle of them. The coastal plain is the "production plant" for many of the species in the area. If you tamper with it, you will change and diminish those areas which have already been set aside. Oil drilling cannot be "good" for caribou calving. It cannot be good for the musk oxen who live there full time. Polar bears den on the coastal plain. I cannot believe they will find oil drilling helpful in their day to day living. There are tens of thousands of birds who make the coastal plain home for a portion of the year. The issue is not one of raising domestic herds of caribou, musk oxen, and polar bears like so many commercial cattle. The folks in Lapland proved that commercial raising of caribou (Reindeer) was possible many hundreds of years ago, so I find little comfort in Donald (Whoops!) Hodel's statements that the numbers of caribou have risen in the Prudhoe area since that installation, as this misses the point. (Mr. Hodell's reputation for accuracy is not very high with most of us in Washington State anyway after his major role in the WPPS fiasco.) The point, I believe, is that this country, at least in one area, should be trying to preserve a large number of animal species in their intact and natural ecological surroundings. This is incompatible with oil drilling.

I am not impressed with the arguments of the proponents of oil drilling. From the figures I've seen in the press there is only a 19% chance oil be found and, if found, a 50% chance that the find will be as large as 3.2 billion barrels. Is a 9.5% chance of finding enough oil to serve the United States' needs for 7 months sufficient reason to disrupt the ecological systems in the Arctic Wildlife Refuge? I believe not.

According to the National Energy Policy plan of 1985, "energy efficiency has proven the most expeditious way to reduce the need for new or imported energy." It has been estimated that one mile per gallon improvement in the efficiency of U.S. automobiles saves 130 million barrels of oil per year. If this is true why is the United States relaxing requirements for energy efficiency of cars? Why was the speed limit raised to 65 MPH on many roads if our energy needs are so pressing as to require destruction of these north slope ecosystems? Disrupting the Arctic Refuge ecosystems, at best, is quite chancy, and it is a "quick fix" one shot proposition which will have a small time limited impact on our energy problems. What we need is an organized approach to the overall energy problems of the United States!

I urge you to vote against any proposals to allow oil and gas exploration on the coastal plain of the Arctic Wildlife Refuge. Please save the "production center" of the refuge.

Sincerely,

Robert S. Thompson

Robert S. Thompson, M.D.

Alaska Wilderness
Guides Association

ALASKA WILDERNESS GUIDES
ASSOCIATION
BOX 141061
ANCHORAGE, AK 99514

Honorable Bennett Johnston (Chairman)
Senate Energy & Natural Resources Committee
US Senate
Washington DC 20510 Oct. 16, 1987

Dear Mr. Chairman and Senators,

The Alaska Wilderness Guides Association is an organization composed of more than 30 guiding businesses and over 60 independent guides that operate wilderness trips in Alaska's wildlands. Many of our members lead trips into the Arctic National Wildlife Refuge and particularly in the arctic coastal plain which is under consideration by your committee for oil exploration. We, as an association, are deeply concerned about the affect oil exploration will have on the ability of our members to continue to operate in this area.

The Arctic National Wildlife Refuge is the finest of all the wilderness preserves in America and possibly the world. It is here that people go to seek the ultimate in wilderness. Citizens from all over the nation, young and old, have visited this refuge. Many of these people have gone with Association members. Guiding organizations such as ours have made it possible for people that may not otherwise be able to partake in such an endeavor to do so.

Oil exploration on the coastal plain in the 1002 area would seriously affect the operations of many of our members.

The developments at Prudhoe Bay have already eliminated a huge block of land and displaced our membership from offering wilderness journeys down the Sagavanirktok River and other rivers in this area.

The Canning River which forms the western boundary of the Refuge has already been seriously impacted by oil exploration activity that took place in the early 60's. Signs of past seismic activity, over 20 years old, are still distinctly visible along its western shore. Is the same fate in store for the area east of the Canning River inside the boundary of the Arctic National Wildlife Refuge?

If oil exploration is allowed in the 1002 area, the Hulahula, Okpilak, Jago and Sadlerochit Rivers will be similarly affected. A number of our members offer rafting and kayaking trips down these rivers. The river sections that cross the coastal plain are a major part of the trips. It is here that guests see bands of muskoxen grazing on the tundra, tremendous aggregations of caribou sometimes numbering in the tens of thousands and the wolves, grizzlies and wolverine that follow the caribou.

These trips end where the rivers run into the Arctic Ocean. From here trip participants look back across a vast expanse of wilderness plains, similar in may ways to the great plains east of the Rockies before Europeans came to North America. Signs of man's activities here are minimal. Views are yet unblimished to the snow-capped mountains and foothills that form the Brooks Range.

In addition to river trips many of our Association members lead backpacking, basecamp and wildlife trips on the plains in the 1002 area. Hiking into the plains along the northern edge of the mountains from the Sadlerochit Range east to the Jago River offers unlimited opportunities for viewing wildlife. Oil exploration activity here will significantly impact these trips. Drilling rigs and other developments will be visible all the way to the coast. There is no way oil exploration activity will not significantly impact these trips.

There is no other place in the Arctic that offers these opportunities. West of the Canning River the Brooks Range dips south and the coastal plain broadens from 40 miles wide to over 100 miles in width. The Prudhoe Bay complex has eliminated much of this adjoining area as wilderness. Farther west the coastal plain and the foothills provence are a patchwork of federal, state and native lands all open to oil exploration and development. The remainder of the north slope is within the Naval Petroleum Reserve.

Oil exploration activity in the Arctic National Wildlife will effectively eliminate our members from offering trips into this area. In 1973, during the pre-construction phase of development, even before the pipeline was built one of our members ran a trip down the Sagavanirktok River. They ended the trip at a gravel bar at the base of the road at Happy Valley (a pipeline construction camp). The following morning they were awaken by squealing tires and gravel flying when the camp manager arrived in an Alyeska pickup.

The first words that were spoken were "What are you doing on Alyeska property? What oil company are you working for?" When he found out these people didn't work for an oil company, that they had just floated down the Sagavanirktok River and that they were out here enjoying themselves, he was even more concerned. The group was told "you are not to set foot off this gravel bar." Effectively this group was eliminated from using this federal land.

Is there any reason to think things would be different along the north slope in the Arctic National Wildlife Refuge?

It is imperative that this committee prohibit oil exploration in the 1002 area. This area should be designated wilderness.

The north slope of the Arctic National Wildlife Refuge is the only place left north of the Brooks Range protected from oil development. This didn't happen by accident!

The 1002 area that this committee is considering opening up to oil exploration is the single most significant piece of wildlife real estate in the United States. As others have said, it is comparable to Africa's Serengeti plains. It seems incomprehensible to this Association that Congress would ever consider doing anything but protect this national treasure as wilderness.

Please include this statement in the hearing record. Thanks you for this opportunity to comment.

Sincerely,

Bob Jacobs

Bob Jacobs (President)

WILDERNESS: ALASKA/MEXICO
1231 Sundance Loop
Fairbanks, AK 99709
(907) 457-8907 or 452-1821

The Honorable Bennett Johnson, Chairman
Energy & Natural Resources Committee
US Senate
Washington DC 20510

Oct. 7, 1987

Dear Mr. Chairman & Senators,

My name is Ron Yarnell. I am the owner of a wilderness guiding business in Fairbanks, Alaska. We have been leading backpacking, kayaking, rafting, wildlife and basecamp trips into the Arctic National Wildlife Refuge since 1976. I am one of dozens of guides and outfitters that operate in this Refuge. We are deeply concerned about proposed oil exploration within the coastal plain of this refuge and the affect it will have on our business.

Over the years Wilderness: Alaska/Mexico has led many groups into the Arctic Refuge including the area under contention in the coastal plain.

We have had guests on our trips to age 78 and as young as 9 years old. These people come from all walks of life with varying income levels. The idea that wilderness is exclusively for the rich and young is far from the truth. One third of our guests do not have much income at all. The average age on most of our trips is 55. If you consider non-guided parties the percentage of lower income levels is even higher.

Oil exploration on the coastal plain of the Arctic Refuge would seriously affect our operations. Drilling rigs, access roads, helicopter use, seismic activity, gravel and water collection facilities, etc., etc. would virtually eliminate the entire 1002 area from our use.

River trips down the the Hulahula, Jago, Aichilik, Sadlerochit and Canning Rivers would be impossible to sell. Backpacks, basecamps, wildlife trips and wilderness fishing and hunting trips anywhere beyond the mountain front (where a significant amount of the wildlife is) would be out of the question.

Drilling rigs, roads, gravel pits, exploration camps etc. are not what people come to see in Alaska's wilderness. Already the radar towers at Barter

Island (40 miles across the coastal plain) are visible from anywhere along the mountain front. It doesn't take much to imagine what the coastal plain would look like with drilling rigs, roads etc. a short ways beyond the mountain front.

The wilderness resource that is available on the coastal plain today would be gone!

The north slope of the Arctic National Wildlife Refuge is the only place left north of the Brooks Range where oil exploration is not allowed. Very little north slope province is protected inside the Gates of the Arctic National Park, further to the west. Potential oil lands were excluded from the park when it was created. The boundary of the park basically stops at the mountain front. The coastal plain in the Arctic Refuge is the only protected place north of the mountain front along the entire 800-mile length of the Brooks Range.

Oil exploration activity not only would destroy the wilderness values of the coastal plain, but it would significantly affect the integrity of the remainder of the Arctic Refuge and the wilderness experience available there. Trips that visit the northern half of the refuge originate out of Barter Island and must fly out across the coastal plain. Exploration activity on the coastal plain would significantly affect the experience of our participants entering the rest of the Refuge.

The Refuge was set aside to protect the unique and diverse forms of arctic wildlife and habitat necessary for this wildlife. It is not in keeping with the original intent of the Refuge to allow oil exploration activity in the 1002 area.

Exploration activity here could seriously affects the movements of the Porcupine Caribou Herd which, as you know, use this area as their calving grounds. The coastal plain, clear out to the arctic ocean, along the entire mountain front from the Canning River into Canada is a critical area, necessary for the caribou. Anything that disrupts the free movement of caribou from the mountains to the coast could have serious consequences on the population levels of this herd.

As anybody that has spend any time in this area knows, the caribou, move from the mountains to the coast as the bug season progresses. On days when the north winds blow cool temperatures and fog from the arctic ice pac inland, the caribou also move inland. When the winds cease and temperatures inland increase again, the caribou return to the cooler coast where they can escape the bugs. This occurs frequently throughout the summer until the caribou return south on their mid-summer migration.

Our trip participants are always amazed at the difference in temparatures 10 or 15 miles inland from the coast. It may be 80 or even 90 degrees in the mountain valleys or along the mountain front, but along the coast temperatures seldom get above 40 degrees.

Last spring we had one of these long hot periods on a paddle rafting trip we did down a north slope valley in the Refuge. Temperatures were consistently reaching recording of 92 degrees, in the shade. Near the end of the trip, along the mountain front, the wind changed and started blowing from the north.

Our last two nights we spent taking midnight hikes to small mountain tops for views out north across the coastal plain to the midnight sun hanging over the yet-frozen Arctic Ocean. On the second night, as the fog crept inland across the slope, caribou by the thousands poured in, under the fog, to graze on the willows and sedges, free from harassment by mosquitoes, while 10 of us visitors watched from above. This is not the first time this has happened on our trips.

Just how much more pressure from development can the caribou of the Porcupine Caribou Herd withstand, is a question I cannot answer. However, there is a limit! There is only so much coastal plain available in both Alaska and Canada. Oil exploration and development activity on the east in Canada and on the west at Prudhoe Bay has already constricted undisturbed habitat to east of the Canning River.

At what point does the herd population begin to be affected? Is it already being affected? Are lands in the eastern part of the Refuge being used more now than they were pre-Prudhoe Bay? Do we have reliable pre-Prudhoe data? Is the herd likely to crash in the future and not be able to recover to present day levels even without additional development? Do we know the answers to these questions let along the effects further activity will have? I do not believe so.

The Canning River is the present western boundary of the Arctic Refuge. A compromise was already made. Prudhoe Bay was developed. Further oil development will continue to be done west of the Canning River. No further oil exploration or development should be allowed east of the Canning River.

This area is presently producing significant economic values in terms of hunting, fishing, backpacking, rafting, wildlife observation etc. (jobs for guides, charter and commercial air pilots, hotel and food service in Fairbanks and Kaktovik, raft manufactures etc. etc.) and will continue to do so if we protect it as wilderness. Why trade one set of resources for another?

Is the potential oil that lies under the Arctic Refuge worth the chance of spoiling the already significant economic benefits being derrived from the refuge? Do we as a nation really need the oil so bad that we would be willing to make the sacrifices (real and potential)?

If so, why do some members of our society want so badly to export Alaskan oil to the Asian market? Why are we paying so little for oil that we are using today. If we need it so bad in the future shouldn't we be paying more for it today so we will conserve it and not need to develop the refuge? Why did we pass an increase in the 55-mile-per-hour speed limit if we need the oil in the Arctic Refuge so badly? Why have we reduced our other energy consevation measures?

The answer to these questions is that we don't need the oil that may lie under the coastal plain of the Arctic Refuge that bad! The oil companies are in the business of making money, just like we all are. But that doesn't mean the nation should sacrifice the Arctic Refuge (and those of us that are presently making an income from it) for more profits for the oil companies.

The oil companies will continue to produce oil and make a profit from it. What about the guides that are presently using the coastal plain? What about the caribou? What about visitors to the Refuge? Will they still be able to sit on the top of a mountain at midnight and watch the caribou pour through, under the fog, to graze on the tundra.

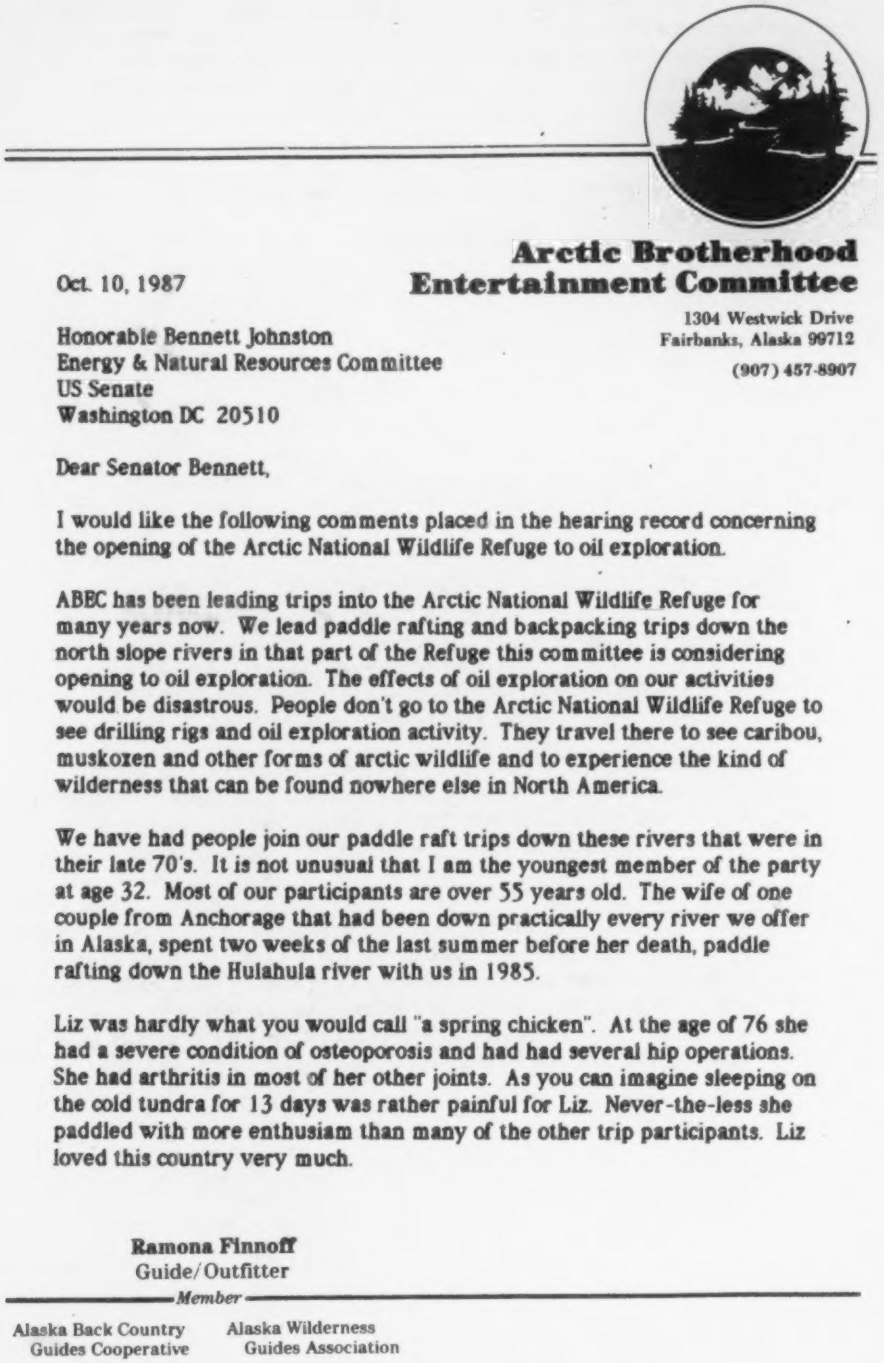
I hope you will consider these broader aspects in your decisions and decide to designate the 1002 area as wilderness. The nation will be richer for it.

Thank you for this opportunity to comment. Please include this in the hearing record.

Sincerely,

Ronald A Yarnell

Ronald A. Yarnell (owner)



Arctic Brotherhood
Entertainment Committee
1304 Westwick Drive
Fairbanks, Alaska 99712
(907) 457-8907

Oct. 10, 1987

Honorable Bennett Johnston
Energy & Natural Resources Committee
US Senate
Washington DC 20510

Dear Senator Bennett,

I would like the following comments placed in the hearing record concerning the opening of the Arctic National Wildlife Refuge to oil exploration.

ABEC has been leading trips into the Arctic National Wildlife Refuge for many years now. We lead paddle rafting and backpacking trips down the north slope rivers in that part of the Refuge this committee is considering opening to oil exploration. The effects of oil exploration on our activities would be disastrous. People don't go to the Arctic National Wildlife Refuge to see drilling rigs and oil exploration activity. They travel there to see caribou, muskoxen and other forms of arctic wildlife and to experience the kind of wilderness that can be found nowhere else in North America.

We have had people join our paddle raft trips down these rivers that were in their late 70's. It is not unusual that I am the youngest member of the party at age 32. Most of our participants are over 55 years old. The wife of one couple from Anchorage that had been down practically every river we offer in Alaska, spent two weeks of the last summer before her death, paddle rafting down the Hulahula river with us in 1985.

Liz was hardly what you would call "a spring chicken". At the age of 76 she had a severe condition of osteoporosis and had had several hip operations. She had arthritis in most of her other joints. As you can imagine sleeping on the cold tundra for 13 days was rather painful for Liz. Never-the-less she paddled with more enthusiam than many of the other trip participants. Liz loved this country very much.

Ramona Finnoff
Guide/Outfitter

Member

Alaska Back Country Guides Cooperative

Alaska Wilderness Guides Association

After Liz's death her husband Al returned again to the arctic, alone this time. At the end of a great paddle raft trip down another north slope river in the Arctic Refuge, Al was complimented on his endurance during a 6 mile midnight hike to a mountain top overlooking the coastal plain stretching to the frozen Arctic Ocean. Al's reply was "I did it for Liz".

How can anyone say such areas are only for the young? The Arctic National Wildlife Refuge means a great deal to people from all walks of life.

ABEC has led innumerable trips down these north slope rivers, across the magnificent coastal plain to the Arctic Ocean. ANWR is the only place left north of the Brooks Range where such trips are possible.

The concentrations of caribou and other wildlife on the coastal plain in the Arctic Refuge is far greater than any other area in Alaska. ABEC has floated most of the north slope rivers across the Brooks Range and no other rivers, except those in the Arctic National Wildlife Refuge, have the kind of aggregations of wildlife found there. It is not unusual to meet bands of caribou, sometimes numbering in the thousands or tens of thousands, crossing the river, swimming on all sides of the rafts, pouring over the hills as if the ground itself had come alive.

At times such as these the air is thick with their scent. Calves are bleating for their mothers. Cows frantically search the shore for that one calf that has the scent of its own. Shedded hair floats down the river concentrating in the eddies and pools along the bank. Onshore the signs of their passing is evident for weeks and even years later. In a matter of hours trails are etched into the tundra. Tracks pulverize the gravel bars.

Is there anywhere left in North America where the concentrations are so great? No! This is it. It may already be too late. Just how much pressure these animals can take is unknown. There are limits and this committee may well be making decisions that go far beyond the tolerance of these animals.

The Arctic Refuge was set aside to protect the wildlife and habitat in this far corner of Alaska. This is the only place on the Arctic slope that is not open to oil exploration. Far too many compromises have already been made. The 1002 area in the Arctic National Wildlife Refuge must be protected as wilderness. This committee must not let speculation for greater profits destroy forever this national treasure.

Are we really concerned about energy independence for this nation? If so, why is there support for exporting Alaskan oil to foreign markets? Why did we increase the national speed limit to 55? Why have we reduced funding for energy conservation programs?

What will we do if we don't find oil under the Arctic Refuge? What will we do after we have used up that oil if we do find it? This nation needs to conserve the oil from the fields we have developed now, not sacrifice other important long lasting resources that are found nowhere else in the United States.

This committee must make decisions that are in the nation's best interest. This interest would be best served by protecting the coastal plain in the Arctic National Wildlife Refuge as wilderness. The resources of wilderness and wildlife are renewable and have economic benefits that are very long ranged. We hope you will see the wisdom of such a decision and not allow the oil industries' greed for short range profits to overshadow the public's interest.

Thank you for this opportunity to comment.

Sincerely,

Ramona Finnoff

Ramona Finnoff (owner)

MANUFACTURING
CREATES
AMERICA'S
STRENGTH

STATEMENT

ON BEHALF OF THE
NATIONAL ASSOCIATION OF MANUFACTURERS

ON
S. 1217
THE PROPOSED "ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987"

BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

OCTOBER 22, 1987

NAM

National Association of Manufacturers
1331 Pennsylvania Avenue, NW, Suite 1500 — North Lobby
Washington, DC 20004-1703 (202) 637-3000

The National Association of Manufacturers is a voluntary business association of more than 13,500 corporations, large and small, located in every state. Members range in size from the very large to the more than 9,000 smaller manufacturing firms, each with fewer than 500 employees. NAM member companies employ 85 percent of all workers in manufacturing and produce more than 80 percent of the nation's manufactured goods. NAM is affiliated with an additional 158,000 businesses through its Associations Council and the National Industrial Council.

Executive Summary

NAM supports S. 1217, the proposed "Arctic Coastal Plain Public Lands Leasing Act of 1987," introduced by Sen. Frank Murkowski (R-AK) which would open the Coastal Plain of the Arctic National Wildlife Refuge (ANWR). Our interest in the Coastal Plain stems from the fact that our nation needs an adequate and secure supply of energy at competitive prices to sustain economic growth. Unfortunatly, recent trends in the oil and gas sector reflect a rising U.S. dependence on imported oil. U.S. petroleum imports were approximately 6 million barrels a day in 1986--the highest level since 1980. If this trend continues, imports could make up nearly 50-60 percent of U.S. needs by 1995.

Such heavy reliance on oil imports could further weaken the U.S. economy, which is why it is imperative that this nation prepare for the future and take action to explore and develop domestic resources including the Coastal Plain of ANWR. In addition, it is also important to note that exploration and development can co-exist with wildlife and strict environmental considerations. One need only look next door to Prudhoe Bay to see that energy resources can be developed in an environmentally safe and responsible manner.

The decisions we make today on ANWR will help to determine how vulnerable we are to imported oil in the near future. NAM, therefore, urges you to support S. 1217 which would give the United States the opportunity to explore for resources that we urgently need.

STATEMENT

ON BEHALF OF THE
NATIONAL ASSOCIATION OF MANUFACTURERS

ON
S. 1217
THE PROPOSED "ARCTIC COASTAL PLAIN PUBLIC LANDS LEASING ACT OF 1987"

BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

OCTOBER 22, 1987

This statement is submitted on behalf of the National Association of Manufacturers (NAM) in support of the committee's hearings on S. 1217 the proposed "Arctic Coastal Plain Public Lands Leasing Act of 1987". NAM supports legislative action that would open up the Coastal Plain of Alaska's Arctic National Wildlife Refuge (ANWR) for oil and gas exploration, development and production.

NAM's interest in ANWR stems from the fact that our association's membership constitutes major users of energy as well as most of the domestic producers. Despite the diversity of NAM membership interests, however, it is safe to say that they are all concerned with international competitiveness, the balance of trade, the federal deficit, national security, and, of course, the health of our domestic economy.

FOREIGN OIL IS DISPLACING U.S. OIL IN THE U.S. MARKET

Today, America's energy producers are rapidly losing ground to imports in the oil marketplace. National energy forecasters now predict that oil imports may increase from 42 percent of the U.S. market to 50-60 percent by the mid 1990s. Furthermore, U.S. imports from the volatile Persian Gulf area have increased 300 percent in 1986 and accounted for more than half of the total increase in imports last year.

But, even with immediate access to high potential areas such as ANWR, this picture will not improve short-term. Exploration and development of Arctic oil and gas usually takes more than ten years from the initial discovery to first production. Consequently, any production from this area is not likely to occur much before the end of this century. At that time, oil production from current U.S. reserves is expected to have declined considerably from the present level of over 8 million barrels per day (bpd) to less than 3 million bpd, and Prudhoe Bay production, which in 1986 is averaging 1.5 million bpd, will have declined (according to the State of Alaska, Department of Revenue) to 280,000 bpd in the year 2000. To compensate for this loss of production, new discoveries of domestic oil must be developed or imports must be increased. There are few alternatives.

But despite its relative inaccessibility, ANWR is actually a valuable potential source of domestic oil, in part due to the in-place infrastructure resulting from Prudhoe Bay development.

TRANS-ALASKA PIPELINE ENHANCES COMPETITIVENESS OF THE ANWR RESOURCES

It should be remembered when considering development of ANWR that the Trans-Alaska Pipeline System (TAPS), which was completed in 1977 and cost approximately 10 billion dollars, is already in place. The close proximity of TAPS to the ANWR region only enhances the resource potential for this area and other economic reasons make ANWR attractive.

The approximate $10 billion cost to place TAPS in operation represents a sunk cost; if capacity is fully used, the marginal cost of utilizing TAPS is independent of this cost and is quite low.

Since the cost of producing petroleum resources at any site includes development and transportation, the availability of TAPS capacity to transport potential North Slope production at ANWR and elsewhere represents a significant cost advantage versus a site where a more expensive transportation option is required.

This cost advantage resulting from the availability of relatively inexpensive TAPS capacity means that fewer resources need to be expended to produce the petroleum resources in ANWR than at a comparable site lacking in-place transportation facilities.

Consequently, the availability of throughput capacity at TAPS for potential ANWR production is not only valuable in that it will help keep out foreign imports, but it will also be economically competitive.

ENVIRONMENTAL CONCERNS

"Economically competitive" however does not exclude "environmentally compatible" development. Opposition to petroleum operations on the ANWR plain arises from the concern that wildlife species and habitat will be significantly harmed. Although any sizeable petroleum operation will have some impact upon the environment, previous experience demonstrates that ANWR resources can be used in a safe and responsible manner.

One need only look "next door" to the Prudhoe Bay operations. It has been proven that industry and environment can coexist in a multiple use land management program.

In fact, several major problems have been resolved as a result of the Prudhoe Bay operation. Aside from the hostile climate and difficult logistics of operating in an extremely remote location, the most challenging technical problems encountered and solved in the onshore Arctic were related to permafrost.

From the years of operating experience there has been developed an environmental protection technology to minimize, and in some cases eliminate, long term changes in the tundra. For example, low-pressure tired vehicles have been developed which can cross the tundra without crushing the vegetative mat or scouring the soils as tracked vehicles might.

The issue of the caribou is of course a concern. Again, Prudhoe Bay serves as an example. When the Prudhoe Bay oil field was developed in the mid-1970s, regulatory agencies acted cautiously and studies were conducted to determine the effects on the Central Arctic caribou herd. In fact, the results of the studies and the tools implemented to prevent damage to the Central Arctic herd were quite positive, in that the herd has increased at a rate of 12-18 percent per year over the past decade. At more than 13,000, it numbers at least four times what it did in 1975 before most of the Prudhoe Bay development activity began. The positive results from Prudhoe Bay and other similar experiences from northern

Europe and the Soviet Union prove that herds can exist in the presence of industrial development, including oil fields and railroads. Wildlife habitats, environmental values, and the petroleum industry can and do coexist.

CONCLUSION

As important as ANWR is, it's only one piece of the major energy puzzle. ANWR is what could rescue this nation from foreign imports and provide for some energy needs well into the 21st century. We must be able to plan for future needs, and ANWR can play a role in meeting these needs.

As you know, an attack on our energy resources is currently taking place on the other side of the world in the Persian Gulf. This area continues to be a "hotbed" of activity which continues to threaten U.S. energy independence as well as the lives of those American servicemen protecting ships in the Persian Gulf. We can ill afford to import more oil from unstable regions, and we definitely cannot afford to lose more American lives to the oil rich nations of the Middle East.

NAM's long-standing policy has been that public land should not be closed to or restricted from resource development and nonwilderness multiple uses in the absence of compelling national interests that override the need for adequate domestic oil, natural gas and other valuable resources. Before areas are set aside for exclusive uses, every effort should be made to determine the availability of materials and other resources on the proposed set asides, and access should be assured to explore and develop the area's resources.

United States' energy policy should be oriented towards significantly reducing our nation's dependence on imported energy resources. The committee took its first step by touring the North Slope and agreeing to continue hearings on this subject. Based upon your recent trip to Alaska, we are certain that you will see the importance in assuring our nation's domestic energy future by enacting legislation that allows development of resources in ANWR.

The development of domestic energy resources, such as those contained in ANWR, are the best hope to reduce America's energy vulnerability, and enhance the ability of U.S. manufacturers to be more competitive in world markets. We must take action against economic influences brought on by unstable energy markets that don't allow for proper planning of manufacturers' energy needs and the producers' opportunity to explore. Thank you for the opportunity to express our views.

Lana R. Batts
VICE PRESIDENT, POLICY
(703) 838-1787

**AMERICAN
TRUCKING
ASSOCIATIONS**

2200 Mill Road, Alexandria, VA 22314

October 22, 1987

The Honorable J. Bennett Johnston
Chairman, Senate Energy and Natural
Resources Committee
United States Senate
136 Hart Senate Office Building
Washington, D.C. 20510

Dear Chairman Johnston:

The American Trucking Associations, Inc. wishes to state its support for S.1217 which would allow the Secretary of the Interior to lease, in an expeditious and environmentally sound manner, the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) for oil and gas exploration, development, and production.

Secure and reliable energy supplies are critically important to the transportation industry. The American Trucking Associations, Inc. believes it is in the nation's economic and security interests to take steps now to assure a continued flow of secure domestic oil supplies for the near term and the more distant future.

A U.S. Department of the Interior (DOI) report recommended that the Congress enact legislation to permit oil and gas exploration and production activities on the ANWR Coastal Plain. As the DOI's report points out, the ANWR Coastal Plain provides one of the best prospects for major new domestic oil and gas discoveries. As the report states: "The area is clearly the most outstanding oil and gas frontier remaining in the United States and could contribute substantially to our domestic energy supplies."

The petroleum industry has demonstrated that oil and gas operations in Alaska are compatible with the Alaskan environment and wildlife. Oil companies have many years of experience in finding and producing oil in northern Alaska without harm to the sensitive arctic ecology. Such operations are strictly regulated by the federal and Alaskan state governments.

Again, the American Trucking Association wishes to acknowledge its support for S.1217 to allow development of the potentially vast oil and gas reserves on the ANWR Coastal Plain.

Sincerely,

Lana R. Batts

Lana R. Batts

/cm

Statement Of
Crowley Maritime Corporation

In Support of S.1217
Opening The Arctic National Wildlife Refuge
To Oil And Gas Leasing Exploration And
Production

Submitted To The Senate Committee On
Energy And Natural Resources

October 22, 1987

The Position of Crowley Maritime Corporation concerning the opening of the Coastal Plain of the Arctic National Wildlife Refuge (ANWR) to Oil and Gas Exploration, Development, and Production.

Crowley Maritime Corporation strongly favors opening the coastal plain of ANWR to oil development. We believe it is in the best interests of the nation to do so, and it is potentially beneficial to our company and its employees.

The United States has good reason to be concerned about future shortages in the supply of oil. The percentage of oil we import has risen substantially in the past two years and now represents about 35% of the nation's requirements. It is estimated that if current trends continue, imports could make up nearly 50% of our consumption by 1990. That much reliance on other countries for a major energy resource endangers industries that produce our goods, our transportation systems, and the heating of our homes. The costs of goods which have oil as an ingredient could rise, returning us to the days, not too distant in the past, of double-digit inflation.

It takes 10 to 15 years to develop petroleum sources in the Arctic. Our existing domestic production of oil is declining, so we need to start now to explore areas where there is a good possibility of finding new sources of oil.

The U.S. Department of the Interior estimates that there are substantial quantities of oil that can be produced from the ANWR coastal plain. Their estimate can only be verified, however, through drilling.

Revenues from the generation of oil in the ANWR coastal plain will benefit the federal and Alaska state governments and the economy of the nation. Crowley Maritime provided almost all of the ocean transportation for the Prudhoe Bay oil fields over the past fifteen years. We could reasonably expect to provide the same kind of service if and when the ANWR coastal plain is developed. Improvement in the Alaskan economy will result in more goods being shipped to Alaska for commercial and industrial development and consumption by the people of Alaska. Crowley Maritime will be able to carry on its vessels a good portion of those cargoes.

Well-intentioned opponents of oil development on the ANWR coastal plain are concerned about effects on the environment. They argue that oil development will cause the demise of caribou and other wildlife. Experience at Prudhoe Bay, the site of the largest discovery to date in the United States, indicates otherwise. There the number of caribou has risen substantially since petroleum operations began, and they graze and move about the area undisturbed by the pipeline and other facilities. The oil companies and the service companies, like Crowley, that support them, understand the need to preserve the environment and have shown their willingness to do so.

If the coastal plain of the ANWR is not developed for oil production under the carefully controlled time schedule envisioned, almost assuredly the day will come when development will be required on an emergency basis. Then the priority for getting the oil out at any cost may well override the concern for the welfare of the wildlife and the environment.

Crowley Maritime believes that development of the ANWR coastal plain for oil production is crucial and that preservation of the environment can be assured. The work should commence now to assure that it is done methodically and with care.

/comics Anchorage Daily News Friday, September 25, 1987 F-1

Oil waste disposal ruled OK

EPA recommends against imposing stricter, costly regulations

By PATTI EPLER
Daily News reporter

Good news for the nation's oil industry: The U.S. Environmental Protection Agency has tentatively concluded that oil-field wastes are being handled just fine the way they are and shouldn't come under more stringent — and costly — regulation as hazardous wastes.

In a draft report being circulated by the EPA, the agency said stricter control of drilling muds, cuttings, produced waters and other oil-field wastes "appears impractical and unnecessary at this time."

The EPA report, which could have far-reaching effects on oil company operations throughout the United States, is the result of a successful lawsuit by Trustees for Alaska, the Alaska Center for the Environment and two Kenai residents. They sued to force the government to comply with a congressional order to study the effects of drilling muds and fluids on human health and the environment.

The EPA is to report its conclusions and recommendations to Congress by December.

In the draft report, the EPA said oil-producing states already have their own laws that provide adequate oversight and environmental protection. Existing federal programs also provide sufficient legal authority to handle most waste problems, the EPA said.

Besides, the agency said, the cost to the oil industry of changing the way it deals with hundreds of millions of gallons of waste annually would, in a worst-case scenario, force a reduction in U.S. oil production of up to 22 percent by the year 2000. And the resulting direct annual cost to consumers could total about $10 billion a year, the EPA said.

"Such regulations could be lo-

See Page F-2, WASTE

WASTE: Disposal is OK

Continued from Page F-1

gistically difficult to enforce and could pose a financial burden on the oil and gas industry, particularly on small producers and stripper operations," the report said.

The study documented numerous cases nationwide where wastes from oil and gas exploration "are known to endanger human health and cause environmental damage when managed improperly."

But the agency said proper management under current law is the best solution to those isolated problems.

The agency said there is a need for more environmental data on waste management technology in Alaska "to provide assurance that future operations can proceed with minimum possible adverse impacts on this sensitive and unique environment."

The oil industry has vehemently opposed any change in the regulation of oil-field wastes. Last year, the American Petroleum Institute estimated industry would have to spend $13 billion the first year in capital investments and $8 billion a year thereafter in operating costs to handle drilling muds and other wastes as hazardous substances.

The EPA's conclusions don't sit well with Trustees for Alaska. Patti Saunders, a staff attorney with the firm, said Thursday the EPA report is fundamentally flawed in a number of ways.

Most important, she said, is the sampling program conducted by EPA to decide if the wastes were hazardous or not. Saunders said the agency did not conduct those tests in the same way it would for other regulated hazardous wastes.

The EPA hasn't shown that oil-field wastes are different from other wastes regulated under the hazardous waste law, she said.

Saunders also took exception to an EPA conclusion that technology for handling the wastes is not likely to change. The idea behind environmental law is to force industry to modernize its technology, she said.

Saunders also criticized the agency's use of oil industry financial and technical information, saying it was not given very close scrutiny.

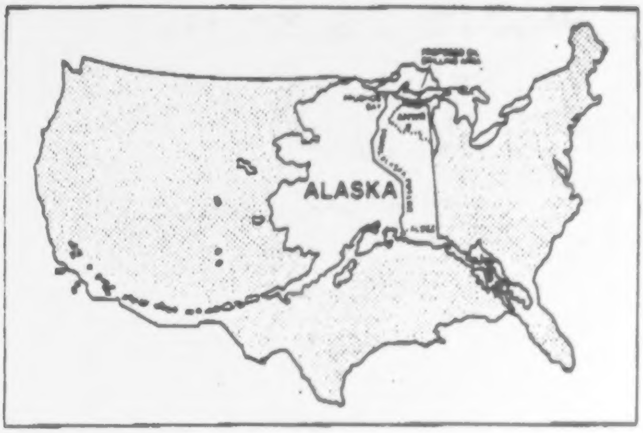
The Trustees group will be filing detailed comments with EPA to be included in the final report to Congress, she said.

Drilling muds, fluids, produced waters and other wastes associated with oil and gas operations have been exempt from regulation as a hazardous waste. In 1980, when Congress passed the hazardous waste law known as the Resource Conservation Recovery Act, it exempted drilling wastes from the stringent regulations until EPA had thoroughly studied their environmental effects.

But Congress never appropriated money for the study and had not done it until forced to by the Trustees lawsuit.

The state recently implemented more comprehensive regulations covering drilling muds and other oil-field wastes. The new regulations are aimed at better disposal of the wastes to prevent leaking into the surrounding environment, said Dennis Kelso, commissioner of the Department of Environmental Conservation.

The regulations not only cover future operations but require that companies correct problems with current disposal pits, he said.



Comments
of the

Resource Development Council
for Alaska, Inc.

On: Oil and gas exploration and development in the Arctic National Wildlife Refuge

To: Senate Energy and Natural Resources Committee

Date: October 22, 1987

Resource Development Council
for Alaska, Inc.

ALASKANS...Working with **Alaskans** to improve the quality of life through sound resource development.

**The Resource Development Council
for Alaska, Inc.**

The Resource Development Council for Alaska, Inc., (RDC) is Alaska's largest private statewide economic development organization committed to the orderly development of Alaska's resources. The broadly-based membership of the Council comes from a wide range of economic, social, geographic and ethnic sectors of Alaska. Our membership represents individuals, companies, trade associations, native corporations, universities, chambers of commerce and local governments throughout the state.

For a decade, the Council's goal has been to achieve a sound, diversified private-sector economic base for Alaska. That means working for agriculture, mining, petroleum, forestry, fisheries, tourism, transportation and power development.

The Council believes public decisionmaking should reflect a proper balance between environmental and economic concerns, recognizing that protection of valuable natural resources can be achieved simultaneously with the protection and enhancement of the state's and nation's economic welfare.

Comments of
the Resource Development Council for Alaska, Inc.
submitted to
Senate Energy and Natural Resources Committee
Washington, D.C.
October 22, 1987

The Resource Development Council for Alaska, Inc., (RDC) strongly supports the opening of the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas exploration and development. In light of the national interest, full leasing of the "1002" area is the most appropriate alternative.

Environmental Opposition and the Prudhoe Bay Record

Although it came as no surprise to Alaskans, the attitude of the environmental opponents to new Alaska oil and gas development might well have astonished some members of Congress. In effect, they have told America's oil industry and others favoring development to "drop dead."

The environmental community has scoffed at the oil industry's outstanding record at Prudhoe Bay and newer Arctic oil fields. They refuse to admit that anything good has ever taken place on the North Slope.

They claim the nation doesn't need more oil from Alaska. To them, any compromise to permit exploration and development is unthinkable.

The testimony has been almost a carbon copy of what appeared before Congress in the last decade when the question of Prudhoe Bay development was on the front burner. With flaming rhetoric, we heard about how development of Prudhoe Bay would destroy the Arctic and exterminate wildlife.

The question of whether eight percent of ANWR should be opened to oil and gas leasing is red meat for environmental fund raisers. They are back on Capitol Hill singing the same old refrain.

Prudhoe Bay and more recent North Slope oil production have proved that the extraction of oil on a grand scale can indeed coexist with the environment and wildlife. The stark disaster predicted for the caribou never materialized.

Yet some environmentalists have charged that there's unbelieveable damage taking place at Prudhoe Bay. It's an easy claim to make, but it's simply not true. The most compelling rebuttal comes from the fish and wildlife populations that continue to feed, reproduce and rear their young throughout the North Slope oil fields.

There is no evidence that animal or bird populations have diminished because of the presence of oilfield activities, nor is there evidence that the ability of the habitat to support future populations of wildlife has been reduced by the very small areas of tundra occupied by all North Slope oil facilities. Of the 600,000 acres enclosed in unit boundaries of North Slope oilfields today, only 8,160 acres are actually occupied.

If the claims made by the environmental community were accurate, Prudhoe Bay, Kuparuk and other North Slope oilfields would be biological wastelands. Obviously, anyone visiting or working on the North Slope knows that this is definitely not the case.

Managing ANWR Petroleum Development

The "footprint" of oil and gas exploration and development activities in ANWR would be even smaller than that at Prudhoe Bay. The facilities at America's largest oilfield were state-of-the art when they were built 15 years ago. But the petroleum industry has learned a lot since then about doing more with less, making things smaller, more compact and efficient.

Any oil development in ANWR would utilize advances such as horizontal drilling techniques, new drill rig technology and engineering advances in building and facilities design to lessen the amount of land needed to produce oil reserves found in ANWR. If full leasing were to occur and a major field developed, oil operations would take up less than 15,000 acres of ANWR's 19 million acres, leaving millions of acres of untouched wilderness inside refuge boundaries.

Given industry's ability to confine operations to very small areas and the capability to employ state-of-the-art technology to assure free caribou movement, the Resource Development Council believes full leasing of the Coastal Plain is the most appropriate alternative over phased leasing. In addition, the evolution of comprehensive federal environmental regulations will guard against detrimental effects. The current regulatory framework is very complex, comprehensive and multi-tiered.

As part of the permitting process, site-specific environmental studies are conducted for small and large projects. Various alternatives and modifications are always considered, and many stipulations, including monitoring programs, are required as part of a permit issuance.

Enforcement of regulations and permit conditions is monitored on a continual basis by local, state and federal agencies, many of which maintain offices at Prudhoe Bay to provide constant monitoring capability.

It is important to note that phased leasing would needlessly hamstring industry's ability to find and extract oil in an economic and timely manner. A wide range of measures can be employed during full leasing activities to effectively mitigate adverse impacts.

Concerns that the Coastal Plain would lose all its wilderness qualities if full leasing occurred are unrealistic. It may surprise some, but the majority of the 1002 portion of the Coastal Plain would actually remain untouched either because no oil was discovered or because reserves were not found in economic quantities. Documents show that many North Slope leases have already been relinquished. Even under a full leasing scenario and assuming development of several major prospects in the 1002 area, most of the ANWR Coastal Plain would remain wild In fact, less than one percent of the land mass would be affected. With full development, 99 percent of the area would remain undisturbed.

Moreover, environmental studies will proceed during the lengthy exploration period. Already many years of industry sponsored field research in the Arctic have made the North Slope one of the most studied ecosystems in the world. These studies, many of which have been subject to agency participation and review at every stage, have greatly increased America's learning curve in Arctic oil and gas exploration and development.

The Resource Development Council not only disagrees with the concept of phased leasing, it also disapproves the withholding of land for the purposes of caribou calving since such a measure is not necessary to assure the continued healthy growth of the Porcupine Caribou Herd.

Although the herd frequently calves on the Coastal Plain, the center of the calving area varies from year to year. It is wrong to assume that a decrease in calf survival will occur if caribou calve somewhere other than where they have in the past.

In the past year, a majority of the herd calved outside of its traditional grounds, an area some biologists call the "core" calving area. In fact, most of the animals calved on the Canadian Arctic Coastal Plain. A number of times since 1970 the herd has calved outside the "core" area because of late breakup and deep snow.

We cannot assume that they would be excluded from calving where they want to should development occur. But, even assuming the worst case -- that they would be excluded -- they can calve in many other areas as they have done in the past without harm.

The facts show that caribou calve anywhere on the Coastal Plain, and in large areas outside the plain. Calving has occurred in broad areas extending from the Canning River eastward into Canada.

It is important to remember that actual surface impact from the development of a major ANWR oilfield would be extremely small. Since these caribou know no political boundaries, they'll continue to move freely across millions of acres of pristine coastal plain habitat in Alaska and Canada.

We are confident of industry's ability to comply with the extensive network of state and federal regulations and permit requirements which will ensure wildlife protection.

America's Energy Needs And The International Scene

Meanwhile, Americans live today in a transitory fool's paradise of inexpensive, plentiful gasoline. Domestic oil reserves are at their lowest levels in over 30 years and U.S. dependency on imported oil is rising to record levels. Crude imports in July reached 46.5 percent of domestic deliveries, a seven-year high. By the mid-1990s, import levels will likely exceed 50 percent of our daily consumption.

While non-development interests apply great energy to discourage development of America's most prospective oil and gas region, we watch the evening news and read front page headlines of the explosive situation in the Persian Gulf. Environmental groups tell us we don't need Alaska oil, but we and our allies find ourselves increasingly dependent on unreliable foreign sources for oil.

Oil is the main reason why the United States finds itself with an expanding military presence in the war-torn Persian Gulf. We are prepared to see our servicemen die to keep the oil flowing, but are we willing to proceed with the inventory of our own energy resources in ANWR?

Whether or not the Persian Gulf situation gets out of hand, it is prudent for us as a nation to develop a plan aimed at preventing the dire economic consequences from an interruption in foreign imports. Alaska's awesome untapped energy potential would be a key ingredient in such a plan.

Although only ten percent of our oil comes from the Persian Gulf area today, it has been estimated that by 1995 up to 70 percent of U.S. consumption may come from foreign oil. Of this amount, about 60 percent would come from the unstable Perisan Gulf.

America must relate the current events in the Persian Gulf to the painful future realities. In terms of energy supply, we cannot afford shortsightedness.

The Alaska factor in the American Energy Equation

Alaska accounts for 25 percent of America's domestic oil production. However, by the turn of the century, Prudhoe Bay production will be a fraction of what it is today. Congress must allow the 49th state to continue to play a pivotal role in providing America's energy needs.

Exploration and development of major new pools of domestic oil is essential, not only as security against any new foreign cutoff but to strengthen the U.S. position in dealing with global oil-related problems. Besides, it takes time to develop Alaska oil fields. Our state needs to be poised, not restrained.

Yet non-development interests argue that the estimated 19 percent odds of finding oil in the wildlife refuge are not promising enough to justify the risks. On the contrary, the stated chances are excellent and among the best in the world. In frontier areas such as Alaska, 2 to 4 percent is considered sufficient to justify exploration.

America must not forget many dry holes were drilled on the North Slope before the giant Prudhoe Bay discovery was made in 1968. It took nearly ten years of additional hard work, pioneering engineering and environmental studies before Prudhoe Bay was finally brought into production. With six billion barrels of production since 1977, Prudhoe Bay has been a vital part of America's energy equation. If we had given up our search for oil after the first ten dry holes were drilled, America would be importing more than half of its oil right now.

America doesn't face a simple choice between energy development in ANWR and conservation. The two go hand in hand. Congress must do all it can to encourage the search for new domestic supplies of oil while implementing progressive conservation measures just to keep pace.

If Not Alaska, Where Else Should America Drill?

If the petroleum industry is not allowed to look for oil in the Arctic National Wildlife Refuge, the nation's most promising onshore area for the discovery of world-class oil deposits, where else should it look? If drilling is prohibited some 200 remote miles above the Arctic Circle in a state where some 70 percent of the residents actually welcome oil and gas development, then where else should America drill?

Is ANWR Really America's Last Arctic Wilderness Stronghold?

We all love wildlife and remote wilderness. But, those who tell the American public that oil and gas development on the Coastal Plain would wreck America's last Arctic wilderness stronghold are just plain wrong. Many Americans would be surprised to learn that development would not eliminate the wilderness values of the refuge and its coastal area.

A true and accurate assessment reveals that some 92 percent of ANWR will remain closed to development even if Congress approves oil and gas leasing on the Coastal Plain. Eight million acres of the refuge, an area five times as large as the acreage proposed for leasing, have already been placed under the permanent designation of Wilderness. So has some 500,000 acres of Coastal Plain contiguous to the "1002" area.

Nor is ANWR the last environmental stronghold in Alaska. One could take the combined states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and Ohio and still not equal the amount of land that has been set-aside as designated Wilderness, national parks and wildlife refuges in Alaska.

Those 220 million acres of federal lands within Alaska alone would comprise the second largest state in the union. If Alaska's 55 million acres of designated Wilderness were made into one state, it would be the 11th largest state. The 74.5 million acres of national wildlife refuges in Alaska is larger than 44 other states. We gave at the office!

If Congress designates the 1.5 million-acre Coastal Plain Wilderness, such action would only serve to increase Alaska's wilderness block by less than three percent. On the other hand, if exploration is allowed, America could have new oil supplies from Alaska by the year 2000 when long gas lines could be commonplace.

ANWR Development Means a Healthy Economy And Environment

A major find on the Coastal Plain would help ease America's growing dependence on foreign oil, saving tens of billions of dollars annually in our balance-of-trade deficit. In fact, ANWR oil production could cut America's energy bill for imported oil by $38 billion annually. Furthermore, development of a major oil field in ANWR would create tens of thousands of new jobs across America. According to Battelle Pacific Northwest Laboratories, it has been estimated that as many as 250,000 jobs nationwide could be created by the year 2005 by opening ANWR, generating over $6 billion in annual salaries.

Positive economic effects would be felt in every state. The development of oil fields on America's North Slope has paid out about $36 billion in business to suppliers and service firms in all 50 states.

Today we can draw on the experience of oil production at Prudhoe Bay and the newer North Slope oilfields to provide an empirical base of evaluating the claims of both sides of the resurrected Alaskan oil debate. Unlike the Prudhoe Bay debate, a decision about developing the vast potential of ANWR can be made on the basis of fact and experience, rather than rhetoric and speculation.

Based on ongoing experience in the Arctic and industry's ever-evolving technology, we can harvest the potentially-rich resources beneath the Coastal Plain while safeguarding the surface environment.

As former EPA chief William Ruckelshaus said recently, "Not only can we have both a healthy environment and a healthy economy but if we don't have both, we won't have either."

Please make sure your action is for sound resource development in the Arctic National Wildlife Refuge. Why sacrifice billions of dollars in annual gross national product when the oil industry has the capability to develop Arctic oil reserves in an environmentally-sensitive manner?

Biological Report 87(   )
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EFFECTS OF PRUDHOE BAY RESERVE PIT FLUIDS ON WATER QUALITY AND MACROINVERTEBRATES OF ARCTIC TUNDRA PONDS IN ALASKA

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PREFACE

Drill mud wastes, together with other wastes from oil drilling operations, are typically stored in reserve pits, sometimes described simply as sumps. In locations where evaporation exceeds precipitation, these reserve pit fluids usually remain contained in the reserve pit throughout the life of a production well and constitute only a small volume of liquid waste, depending on the well depth. However, in areas such as Alaska's North Slope, with continuous permanently frozen ground (permafrost), evaporation rates are extremely low and snow drift fills the reserve pits annually. Following snow melt, little, if any, freeboard exists making reserve pits especially prone to breaching, overtopping, and seepage.

As a result of the need for discharges, the State of Alaska has allowed, since 1983, the permitted discharge of reserve pit fluids to the tundra or to roads and pads, depending on the contents of the reserve pit fluids. This study was initiated to evaluate the impacts of intentionally and accidentally discharged reserve pit fluids on water quality and invertebrate populations in tundra ponds.

Our report is organized into five main sections: introduction, study area, methods and materials, results, and discussion and conclusions. Within the results section, subsections cover water quality, contaminant levels, and invertebrate richness and abundance. A final subsection addresses the relationship of water quality and contaminant variables to invertebrate richness and abundance patterns in the receiving environment.

The report summarizes results from our 1983 field study. Although the report is anticipated to be useful in assessing impacts from reserve pit fluids under Arctic conditions and in evaluating possible management strategies, it was not intended as an exhaustive study. Nor can the results be wholly extrapolated to present-day oil field practices. State regulations concerning reserve pit fluid discharges have become increasingly stringent since 1983. Also, some industry practices have changed. For example, chrome lignosulfonate drill muds have been replaced, to some extent, by non-chrome lignosulfonates and diesel oil has been largely replaced with less toxic mineral oil in drilling operations.

From 1985 to 1987, the Fish and Wildlife Service initiated additional studies on Prudhoe Bay reserve pit fluids to examine impacts to tundra pond water, sediment, and biota, to evaluate acute and chronic toxicity through bioassays, and to examine biouptake of metals and hydrocarbons by resident species, including invertebrates, sedges, fish and birds. Reports on these investigations have not yet been prepared, but should also be consulted by the interested reader when they become available.

Requests for this publication should be directed to the following sponsor address.

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SUMMARY

Macroinvertebrates from tundra ponds have been shown to be an important food resource for numerous waterfowl and shorebirds nesting in Arctic tundra wetlands, including birds in the Prudhoe Bay area of Alaska. We attempted to determine if water quality or the macroinvertebrate community of these ponds was being adversely affected by oil field operations. In particular, we examined the impacts of direct and indirect discharges of reserve pit fluids into tundra ponds. Reserve pit fluids, including drill muds and other wastes from well drilling operations diluted by snowmelt, constitute a large waste stream produced by the oil production industry.

Preliminary June 1983 inspections revealed visible oil sheens at 52% of all reserve pits inspected and discharges of reserve pit fluids from 61% of these pits. Many of these discharges were directly to tundra wetlands, while others were to gravel roads and pads. Heavy metal concentrations in 6 pit fluids were high; hydrocarbon concentrations were also high in 3 of the 6 pits sampled.

A month after preliminary observations, we took additional grab samples of water for water quality, metal, and hydrocarbon analyses and sweep net samples of invertebrates at the 6 drill sites, including samples from a

reserve pit on the drill site, from a pond adjacent to the reserve pit, and from a more distant pond with connections to the adjacent pond. Similar sampling occurred at 3 control ponds.

We used Friedman's method of randomized blocks to examine differences between drill site locations and between reserve pit, adjacent pond and distant pond treatments. Differences between treatments were statistically significant ($P \leq .05$) for all water quality and biological measures, and far exceeded the differences between drill sites. Stepwise discriminant analyses of water quality, contaminant, and biological variables not significantly affected by location indicated that reserve pits, receiving ponds, distant ponds, and control ponds can be readily distinguished from each other on the basis of water quality and biological variables. However, location significantly affected most contaminant concentrations. Contaminants not affected by location (aluminum, arsenic, and aliphatic hydrocarbons) did not enable sufficient distinction between treatments. Of the water quality characteristics, reserve pits and ponds were best separated by a primary discriminant function corresponding to a gradient in turbidity, and by a second discriminant function reflecting progressive increases in alkalinity from control ponds to distant ponds to receiving ponds. Among the biological variables, the total number of taxa was the biological measure first selected in the stepwise process; this variable alone was sufficient to distinguish among all treatments, accounting for about 89% of the variance between the treatment pits and ponds. Samples from all six reserve pits were devoid of invertebrates.

Comparisons of adjacent receiving ponds with control ponds by Kruskal-Wallis tests revealed the scope of the effects of contaminants. Hardness, alkalinity, turbidity, chromium, barium, arsenic, and nickel were all elevated in receiving ponds ($P \leq .05$). Differences between distant ponds and control ponds were less pronounced, but alkalinity, chromium, and aliphatic hydrocarbons were higher, and the number of invertebrate taxa was lower in the distant ponds.

The results of simple linear regressions of chemical data on biological data (pits excluded) were used to suggest water quality and contaminant variables indicative of adverse environmental impacts. Water quality characteristics that best predicted deteriorating biological conditions were alkalinity and hardness, and the metals most indicative of biological change were arsenic and barium. In addition, chromium concentrations in reserve pits and ponds near drill sites may have exceeded chronic toxicity criteria for protection of aquatic life set by the U.S. Environmental Protection Agency (EPA), and high concentrations of chromium had obviously dispersed into distant ponds. The measurement of these variables should assist in more effectively screening reserve pit fluids prior to permitting their discharge to the tundra.

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INTRODUCTION

Prudhoe Bay, on the Beaufort Sea coast in Arctic Alaska, is the site of the largest oil field ever discovered in the United States or Canada (Figure 1). The Prudhoe Bay area serves as the center for North Slope oil and gas exploration as well as a focal point for crude oil production. Associated with oil production activities is the possibility of environmental pollution. One source of contaminants is drilling fluids from reserve pits, also known as sumps.

Reserve pits associated with oil production on the North Slope are generally above-grade basins within gravel drilling pads. The pits are designed to hold drill muds, cuttings, and wastewaters from production drilling. They may also contain contaminated or uncontaminated snow, material from local oil spills, and other drilling wastes.

Reserve pit contents vary considerably, since more than 600 trade name materials, including thousands of components, are available for use (Dames & Moore 1978; Wright and Dudley 1982). Only a few components are typically used, however, in any particular oil field or individual well. The various components serve as weighting agents, viscosifiers, thinners, pH and ion controls, dispersants, corrosion inhibitors, lubricants, emulsifiers, foamers and defoamers, and as flocculants. The geological formation being drilled also influences pit chemistry, as do the kinetics of the drill fluids given the local pH, temperature, and other variables. Rapid chemical reactions that occur during drilling at high pressure and temperature are followed by slower changes in the pit, such as those resulting from decomposition by photochemical or other oxidation processes (National Research Council 1975; Karrick 1977), emulsification (Berridge et al. 1969), and microbial degradation (ZoBell 1973; Atlas 1975, 1981). In addition, the phase and location of different chemical species may vary depending on polymerization, sedimentation, freeze exclusion, flocculation, scavenging by and complexing with other compounds, resuspension by wind mixing, and entrainment in ice slurries or other substances.

National standards for permissible onshore discharges have not been developed, nor has a consensus on water quality for discharge of pit fluids been achieved by the states, due to the complexities of reserve pit chemistry, both within and between oil fields. Before 1983, pit fluids regularly entered nearby wetland habitats in the Prudhoe Bay area by seeping through reserve pit walls and bottoms, overtopping of pits, breaching (failure) of the berms, road dust control with the fluids, and deliberate discharge from the pits (dewatering) to adjacent ponds or wetlands. Beginning in 1983, the Alaska Department of Environmental Conservation (ADEC) began regulating discharges and granted a variance for disposal based on certain restrictions. Dewatering was prohibited if there was a visible oil sheen on the water surface in the pit or "if toxic substances or salt concentrations exceed those expected to cause damage to vegetation, fish and wildlife, or could affect public health." ADEC further stipulated that "in surface water receiving these discharges" State Water Quality Standards described in 18 ACC 70 not be violated. Subsequently, oil industry data on all discharges were requested. In June 1984, additional, more specific water quality standards for direct tundra discharge on the North Slope were promulgated in a General Permit, including a total settleable solids limit of 0.2 mL/L and a salinity limit of 3 $^{o}/oo$. In addition, ADEC required that pits not be discharged until one year after the last input of drilling effluent or other wastes.

During summer 1983, the U.S. Fish and Wildlife Service began a study of the effects of pit fluid discharges on water quality and the macroinvertebrate community of tundra ponds. Water quality variables included pH, conductivity, dissolved oxygen, hardness, alkalinity, and turbidity. Water samples were also analyzed for arsenic and metal concentrations (aluminum, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc), as well as for hydrocarbon concentrations. Samples were collected from reserve pits, from ponds initially receiving reserve pit fluid discharges, and from more distant connected ponds. Three remote ponds (controls) were also examined. Aquatic macroinvertebrates were studied because they are resident species, sensitive to local environmental changes, and widely recognized as sensitive indicator organisms for a variety of environmental pollutants (Hilsenhoff 1977; Buikema and Cairns 1980; American Public Health Association [APHA] et al. 1981).

The North Slope serves as an important nesting, rearing, molting, and feeding ground for about 150 species of sea birds, shorebirds, waterfowl, raptors, and passerines (Norton et al. 1975). The study was undertaken because aquatic macroinvertebrates are an important food of many of the water birds in the Arctic (Pitelka 1959; Holmes 1966; Holmes and Pitelka 1968; Hilden and Vuolanto 1972; Bergman et al. 1977; Derksen et al. 1981; Connors 1983). The overall availability of invertebrates for food is an important consideration in rating suitability of wetland habitat for birds. Female ducks require a high protein diet during the nesting season (Moyle 1961; Bengtson 1971) and their young have similar requirements for fast growth (Chura 1961; Collias and Collias 1963; Bartonek 1972). This high protein diet is generally supplied by aquatic macroinvertebrates in early summer before the emergence of adult insects.

We compared water quality and contaminant concentrations with aquatic invertebrate richness and abundance patterns to identify habitat changes. We assumed that any chronic detrimental effects on bird populations may not be observable for a number of years and that the degree of those effects will depend on decline of food organisms as well as on the bioaccumulation and biomagnification of contaminants, if these processes are occurring.

STUDY AREA

The Prudhoe Bay area is characterized by flat open expanses of wet and moist tundra vegetation dominated by the sedge *Carex aquatilis* and the grass *Arctophila fulva* (Walker 1981). Shallow lakes and countless shallow ponds cover the area, which is entirely underlain with permafrost. Much of the area is flooded when the snow melts at breakup, usually in June. Surface sheet flow is supplemented by water transport through systems of interconnected polygon troughs that delineate the patterned ground. Drier areas are found mostly along shores of drained lake basins and on raised polygon rims, but even these areas may be flooded at breakup if the accumulation of snow is heavy or if melting is rapid.

The entire Prudhoe Bay area is traversed by a road system and pipelines and in the mid 1980s included more than 70 drill sites (= pads), as well as development centers and related facilities, all built on a layer of compacted gravel. Three north-south river systems occur in the Prudhoe Bay area—the Sagavanirktok, Putuligayuk, and Kuparuk rivers.

We selected sample pond sites on the basis of: (1) their proximity to a discharge site where direct or indirect discharges had occurred during

June 1983, and (2) the availability of both an adjacent pond receiving the discharge and a more distant pond in the same drainage (with polygonal trough or surface connections to the adjacent pond).

Control and experimental ponds were selected on the basis of similarity in physical characteristics (including depth and temperature) and chemical characteristics (especially salinity).

We selected control ponds in areas with no previous development of drill pads within several miles. Figure 2 shows the location of sample and control sites. Three drill sites each were chosen in the Atlantic Richfield Company Alaska Inc (ARCO) (drill sites 6, 16, and 18) and in the Standard Alaska Production Company (SAPC) (drill sites A, E, and N) portions of the Prudhoe oil field. All adjacent ponds were within 25 meters of the gravel pad and were the direct receiving waters for the discharges from the reserve pits in June. Three of these ponds (at drill sites 16, 18, and A) were in contact with the gravel pad; two (drill sites 18 and A) had additional gravel contact and were impounded on at least one additional side. A fourth receiving pond (drill site E) was not in contact with the pad, but had an extensive gravel bottom, as a result of gravel-contaminated snow being bulldozed into the pond. Discharges resulted from overtopping of a dike at drill site 6 and truck spraying of the pad at site 18, rather than from the direct pumping of effluent into the tundra, as at other sites.

The distant ponds were 35 to 115 m from the adjacent ponds (average distance, 93 m). They were connected to the adjacent ponds by polygonal troughs. At the time of discharge, surface sheet flow also probably occurred between adjacent and distant ponds. Two of the control ponds were within the designated area off Oliktok Road shown in Figure 2. The remaining control site was north of drill site E.

Hereinafter we designate sample sites by the drill sites named above, and by treatment, where reserve pits are treatment 4; adjacent receiving ponds, treatment 3; distant ponds, treatment 2; and control ponds, treatment 1. Treatment is used strictly in a statistical sense to distinguish sample groups that are compared with each other, rather than in a biological sense to refer to a prescribed experimental treatment.

MATERIALS AND METHODS

Preliminary sampling began on June 6, 1983. We visited accessible production pads in the Prudhoe Bay oil field to determine which reserve pits were being dewatered and to quantify the number of pits with visible oil sheens and piles of drill cuttings. Grab samples were taken of discharge water for analysis of heavy metals and for hydrocarbon analysis. These samples and samples taken later in the summer are listed in Appendix Table A-1. Temperature, pH, and conductivity were also measured in the field during the June sampling. A HACH Mini-Digital pH Meter calibrated with buffer solutions was used to determine pH, and the remaining variables were measured with a YSI Model 33 SCT Meter and probe. The accuracy of conductivity measurements was checked with a conductivity standard.

We followed methods recommended by APHA et al. (1981) in collecting water samples: both the preliminary (June) samples and later samples for heavy metal analyses were collected in laboratory-cleaned, 1-L polyethylene bottles and preserved with analytical-grade concentrated nitric acid; hydrocarbon samples were collected in 1-L, laboratory-cleaned glass bottles and preserved with analytical-grade sulphuric acid. Samples were stored for several days at 0-4°C in coolers furnished with blue ice and then refrigerated. Samples were subsequently shipped in coolers with blue ice to the U.S. Fish and Wildlife Service Patuxent National Wildlife Research Center (Laurel, Maryland) for analysis.

Six sample sites chosen in June were sampled again beginning July 27, 1983, about 1 month after the last discharges from the pits onto the tundra. Samples were taken to be analyzed for heavy metals and hydrocarbons from the previous point of discharge in each adjacent pond. Temperature, pH, and conductivity were measured as before, in addition to dissolved oxygen, hardness, alkalinity, turbidity, water depth, and sediment depth. A HACH AL-36B Titration Kit was used to determine dissolved oxygen, hardness, and alkalinity. To check the strength of the phenylarsine oxide titrant for the dissolved oxygen test, we used an iodide-iodate standard solution equivalent to 10 mg/L dissolved oxygen. An HF Instruments Model DRT-15 nephelometric turbidimeter was used to measure turbidity, after calibration with secondary standards. Water and sediment depths were measured by probing a wooden dowel first to the water/sediment interface and then to the bottom of the soft sediment layer. Characteristics measured at each site are reported in Appendix Table B-1.

Identical samples for chemical analysis were collected at the reserve pit, at adjacent ponds that had earlier received the pit discharges, at the distant ponds within the same drainage, and at the control ponds.

Invertebrate samples were collected with a sweep net (30.5 x 7.6 cm) having 7.9 meshes/cm, according to procedures used by Weller (1972); Howard

(1974); and Abraham (1975). About 1 m^2 was sampled for macroinvertebrates (Figure 3). Free-swimming, planktonic, and epibenthic invertebrates were all sampled by this method. Two complete sweeps were made from one location within the sample pond and captured organisms from each sweep were transferred to separate white enamel sorting trays for examination. If the samples appeared to be roughly similar, they were preserved together as one sample in 70% ethyl alcohol. If the samples did not appear to be similar, we discarded both to avoid bias as a result of making a sweep through an occasional swarm of Daphnia or copepods. This process was repeated at three locations so the three combined replicates from each pond represent six total sweeps for the site. This sampling was repeated at each of the six pits, six adjacent ponds, and six distant ponds, and at the three control ponds. Although the method was only semiquantitative, it enabled comparisons between treatments without introducing an even greater bias that can be incurred when the distribution of highly clustered populations is not specifically evaluated before quantitative sampling (Pielou 1978).

Except for nematodes, preserved invertebrates were sorted and identified to order, suborder or family. The various taxa used to determine taxonomic richness (i.e., total number of taxa) and taxonomic diversity (Shannon-Wiener H' diversity), together with code designations for taxa, are shown in Appendix Table C-1.

The following methods were used in the analysis of metals samples: hydride generation atomic absorption (arsenic and selenium); cold vapor atomic absorption (mercury); and flame atomic absorption (aluminum, lead, copper, zinc, nickel, cadmium, barium, and chromium). Instrumentation included a Coleman Model 50 Mercury Analyzer and Perkin-Elmer Models 403, 460, and 703 Atomic Absorption Spectrophotometers. Determinations were made by comparison with aqueous standards.

Hydrocarbons were determined with a Hewlett-Packard Model 5711 Gas Chromatograph equipped with an FID Detector Model 18740 and a glass capillary inlet system. The Model 3352B Lab Data System, set up with chromatographic software, was used to integrate the peak areas. Metals and hydrocarbon data for the June sampling are presented in Appendix D in Tables D-1 and D-2, respectively. Appendixes E and F present corresponding July-August data.

Data were analyzed with an IBM PC computer linked to a DEC VAX 8800 mainframe computer at the University of Alaska, Fairbanks. SPSSX software was used for all analyses. Since all treatment data except those for controls were effectively taken in blocks (by drill site), a Friedman two-way analysis of variance for randomized blocks (Sokol and Rohlf 1981) was first used to examine the effect of treatment and location. Using this method, we ranked variates within each block for each treatment (reserve pit, receiving pond, and distant pond). Because block effects were few, we considered treatments at different drill sites as replicates for most remaining analyses.

We used discriminant analysis to comprehensively evaluate measurable differences between all treatments, including control ponds. Distinguishing characteristics of water quality, contaminant levels, and biological variables were examined in three separate, stepwise discriminant analyses. This examination resulted in the discrimination of treatments by maximizing the among-treatment to within-treatment sums of squared deviations for multiple variables within each set (Cooley and Lohnes 1971). For these analyses, the F ratio-to-enter was set at 4 to exclude less important variables. Scatterplots and classification tables are presented depicting the success of the discriminant functions in separating and classifying each case in the results section. Additional discriminant analysis results are included in Appendix G.

We also made pairwise comparisons of receiving ponds, distant ponds, and control ponds, using the Kruskal-Wallis H test. Water quality and contaminant variables determined to be important in distinguishing between treatments by these analyses were regressed on selected biological variables to determine the variables correlated with adverse biological impacts.

RESULTS

WATER QUALITY

Water quality measurements made in late July and early August 1983, are shown in Appendix Table B-1. Comparison of the water quality of the three control ponds with the six distant ponds, six adjacent ponds, and six reserve pits revealed noticeable trends in water quality change from the control ponds toward the reserve pits (Table 1). Turbidity and pH both tended to increase with treatment (control, far pond, adjacent pond, and reserve pit). Conductivity also tended to increase toward reserve pits; however, one of the three control ponds, located closest to the coast, was naturally high in conductivity. Dissolved oxygen diminished from control to pit sites, but with the exception of one receiving pond, remained above 50% saturation (APHA et al. 1981). Hardness and alkalinity were higher in adjacent ponds than in reserve pits. High concentrations of metals, anionic detergents, or greater concentrations of suspended or colloidal organic matter may have interfered with hardness measurements in pits (APHA et al. 1981).

In Friedman tests, the variation between each of the above variables and treatment was significantly greater ($P \leq .05$) than the variation with location (Table 1). Consequently, we combined the different locations in the remaining analyses.

Discriminant analysis of water quality characteristics by treatment revealed a clear separation of reserve pits and pond types (Figure 4). Although significant differences were found between treatments for all water quality variables, two discriminant functions accounted for 100% of the variance (64% and 36%). Reserve pit and pond treatments were best separated by Discriminant Function 1, corresponding to a gradient of increased turbidity and significant differences ($F_{3,17} = 15.18$, $P \leq .001$) between reserve pits and pond treatments. Receiving ponds, distant ponds, and control ponds were best separated by alkalinity ($F_{3,17} = 11.36$, $P \leq .001$). Alkalinity differences were generally sufficient to separate receiving ponds and distant ponds from control ponds after the variance explained by turbidity was removed. The highest degree of variation in discriminant function values occurred in reserve pits, while the lowest variation is seen in control ponds. Using Discriminant Functions 1 and 2 (turbidity and alkalinity), we misclassified only 3 of 21 waterbodies (two receiving ponds and one distant pond) as to treatment (Table 2).

Comparisons of receiving ponds and distant ponds with unmatched control ponds and with each other, by the Kruskal-Wallis H test, illustrate specific differences between pond treatments (Table 2). Alkalinity, hardness, and turbidity were all significantly higher ($P \leq .05$) in receiving ponds than in controls, whereas pH, conductivity, dissolved oxygen, water temperature, water depth, and sediment depth did not differ significantly between the two treatments. Alkalinity was the only water quality variable that was significantly different (higher) in distant ponds than in the controls.

ARSENIC, HEAVY METALS, AND HYDROCARBONS

The analysis of preliminary samples of pit fluid from the June 1983 survey revealed high concentrations of arsenic and metals, including lead, copper, zinc, nickel, barium, chromium, and aluminum, in most of the pit water samples (Appendix Table D-1). The preliminary inspection of pads in June 1983 disclosed visible oil sheens at 17 of 33 pits (Appendix Table D-2). Likewise, high hydrocarbon concentrations were found in some of the pits sampled in June, particularly at drill sites A and 6 (sample sites 4 and 1, respectively, Appendix Table F-1). The composition of the hydrocarbon sample at drill site A resembled that of fresh Prudhoe Bay crude oil (Mackay et al. 1980).

Results of the laboratory analysis of arsenic and 10 heavy metals and selected aliphatic and aromatic hydrocarbons in July-August sampling of pits and ponds are given in Appendix Tables E-1 and F-2. In general, metal contaminant levels in pits tended to decrease from June to late July or early August. This was especially true when the metal concentration in June was high. However, decreases in concentrations of chromium and lead did not appear to be as great as those of copper, nickel, and zinc. Concentration levels of many metals may have reached an equilibrium point as a result of sorption onto the suspended material maintained in the water column after an initial post-breakup settling of heavier sediment fractions. However, the pattern of change was not entirely consistent, reflecting possible heterogeneity in the concentration of metals within the pits for which our composite grab sampling was inadequate. Lead in one of six pits and barium in four of six pits showed pronounced increases in July-August.

There was also a general tendency for hydrocarbon concentrations to be lower at the second sampling than at the first. In pit A, concentrations in June were extremely high but almost negligible in late July (Appendix Table F-2, sample 16). On the other hand, some pits showed slight increases. Besides within-pit heterogeneity, weathering, and volatilization, several factors that may have confounded comparisons of metal and hydrocarbon concentrations in June and July included rope or skimming operations conducted by oil companies to clean up surface oil in pits, and possible additions to reserve pits between the sampling times. Specific wind-mixing events may also have influenced concentration levels by resuspending contaminants from sediments and by windrowing hydrocarbons at various pit edges.

In the midsummer (July-August) sampling, aluminum, barium, chromium, zinc and arsenic showed a pattern of increase from control ponds to the pits (Table 4). However, treatment differences at drill sites were only significant ($P \leq .05$) for aluminum, arsenic, and aliphatic hydrocarbons (Table 4). Discriminant analysis of these variables failed to clearly differentiate between treatments. Aliphatic hydrocarbon concentrations did separate reserve pits from ponds at four of six sites but did not adequately separate receiving ponds from distant ponds and control ponds (Figure 5).

Comparisons of specific pond treatments (reserve pits excluded) by Kruskal-Wallis tests (Table 5) were more informative. Concentrations of cadmium, chromium, barium, arsenic, and nickel were significantly higher in receiving ponds than in control ponds, whereas levels of chromium were significantly higher in distant ponds than in control ponds (Table 5). Thus, chromium was the most mobile metal in terms of dispersion into distant ponds.

INVERTEBRATE RICHNESS AND ABUNDANCE

Lists of macroinvertebrate taxa and numbers found in each sample are presented in Appendix Tables C-1 and C-2. The six reserve pits were devoid of invertebrate taxa; receiving ponds each contained 2 to 5 taxa, distant ponds 4 to 10, and control ponds 10 to 13. Chironomids predominated in all ponds adjacent to reserve pits; other taxa were extremely rare. In contrast, the dominant taxa in various distant ponds included chironomids, calanoid copepods, daphnids, nemourids, and physids. In half the distant ponds, two of the above taxa codominated. Taxa in control ponds strongly resembled those in distant ponds. However, two to three taxa tended to be codominant and proportionally fewer taxa were rare. The most common taxa included chironomids, calanoid copepods, daphnids, nemourids, and in one control, baetids. Two new taxa were found in control ponds, hydrids and pleids; however, these taxa were rare.

Treatments are compared in Table 6. The richness decreased sharply from treatments 1 to 4. Differences between treatments (versus between drill sites) were highly significant ($X^2 = 11.08$, df = 2, $P \leq .004$) (Table 6).

A similar trend in taxonomic richness was observed when H', the Shannon-Wiener Index for taxonomic diversity, was used instead of numerical comparisons of taxa. Likewise, the total abundance of organisms (log transformed) appeared to be strongly related to treatment. This pattern is largely attributable to the abundance pattern of crustaceans, primarily daphnids. Dipterans (especially chironomids) tended to increase in abundance in ponds adjacent to reserve pits whereas nondipteran insects showed a corresponding decrease.

Since significant differences in all biological measures were reflections of treatment rather than drill site, as indicated by Friedman tests, locations were combined and a discriminant analysis was applied to all biological variables. Although all biological measures differed significantly between treatments, the first variable component of Discriminant Function 1, the total number of taxa ($F_{3,17} = 53.87$, $P \leq .001$), sufficiently discriminated between all treatments (see Appendix G), accounting for 89% of the variance; a minor contribution (11%) was also made by Discriminant Function 2, represented by the number of dipterans (Figure 6). Three of 21 waterbodies (two distant ponds and one receiving pond) were misclassified by use of these functions (Table 7).

Pairwise statistical comparisons between receiving ponds, distant ponds, and control ponds through Kruskal-Wallis tests also showed that control ponds had a significantly greater number of invertebrate taxa, a higher diversity of these taxa, and more organisms, including more crustaceans and more insects, except dipterans (Table 8) than adjacent ponds. Only one of these measures--total taxa--distinguished distant ponds from control ponds.

CORRELATIONS BETWEEN INVERTEBRATE POPULATIONS AND WATER QUALITY AND CONTAMINANTS

Water quality and contaminant variables selected as important in the discriminant and Kruskal-Wallis tests were regressed on biological variables to evaluate possible interrelations. Also, the data were plotted to evaluate possible curvilinear relationships that would be obscured by simple linear regressions. Reserve pit samples were excluded from this analysis since they contained no invertebrates. None of the plots indicated an obvious bell-shaped response curve or other third-degree polynomial function. However, some of the relationships appeared to be best described by exponential functions. In these plots, the linear function was also indicative of the importance of the variable, hence no further analysis is presented. Table 9 shows the results of simple linear regression analysis.

The variable "total taxa" was negatively correlated with hardness, alkalinity, barium, and arsenic—as was Shannon-Wiener (H') taxon diversity. The total abundance of organisms (log-transformed) was not statistically correlated with any single variable. Nor were there linear correlations between the abundance of dipterans or crustaceans and any single water quality or contaminant variable. However, nondipteran insects were positively associated ($P \leq .05$) with waters with high conductivity and high lead concentration.

DISCUSSION AND CONCLUSIONS

Our results indicated a clear difference in water quality and in biological measures between reserve pits, receiving ponds, distant ponds, and control ponds in the Prudhoe Bay area. These differences appeared to be related to fluid discharges from reserve pits into tundra ponds. Turbidity, alkalinity, pH, and conductivity tended to increase and dissolved oxygen to decline from remote (control) ponds to reserve pits. In discriminant analysis, turbidity most clearly separated reserve pits from all other treatments; other water quality variables distinguished the other three pond treatments.

Similar gradients of increase from control ponds to reserve pits were also demonstrated for arsenic and certain metals (barium, chromium, and zinc) and for hydrocarbons. However, none of these variables distinguished all the pond treatments from each other. Contamination of both receiving ponds and distant ponds sometimes caused sufficient overlap in concentrations (e.g., as in chromium) to preclude separation of these treatments. Certain metals were only detected sporadically in a given pond treatment (e.g., lead), or variance was exceedingly high within treatments (e.g., copper). Specific comparisons between receiving ponds and control ponds, however, revealed the scope of contamination more clearly. Receiving ponds had significantly greater concentrations of chromium, arsenic, cadmium, nickel, and barium than did control ponds, whereas chromium concentration was significantly higher in the distant ponds than in the controls.

Although the overall taxonomic richness, diversity, and abundance was low, reserve pits, receiving ponds, and distant ponds differed significantly in these biological measures. Except for dipteran abundance, values of all measures tended to decrease from control ponds to receiving ponds. In the discriminant analysis, the total number of taxa was sufficient to distinguish treatment groups: reserve pits supported no invertebrates, and progressively more taxa were sampled from receiving, distant, and control ponds. One of us (E. Snyder-Conn), in 1985 and 1986, found a few Prudhoe Bay reserve pits (2-3 in approximately 50) that supported copepods or daphnids. Thus, not all—but nearly all—reserve pits can be portrayed as devoid of invertebrates.

Unlike other invertebrate groups, dipterans--particularly chironomids--tended to increase in abundance in ponds that received direct discharges of reserve pit fluids. A shift in invertebrate community composition thus appeared to result in ponds receiving reserve pit discharges. However, crustaceans--the numerically most important zooplankton group—appeared to diminish in both abundance and diversity in ponds adjacent to reserve pits. Such shifts toward increasing numbers of dipterans and concomitantly diminished numbers of other macroinvertebrate taxa and lowered species diversity have also been documented in temperate streams affected by oily effluents (Wilhm and Dorris 1968; Wilhm 1970; Woodward and Riley 1983).

The contaminants of the greatest immediate concern in receiving ponds and ponds connected to them are chromium, arsenic, and barium. Evidence that chromium disperses from receiving to distant ponds is particularly compelling (Figure 5), since no chromium was detected in any of the control ponds. The mean concentration of chromium was 0.084 mg/L (range = 0.018 to 0.210 mg/L), in receiving ponds; and 0.070 mg/L (range = 0 to 0.170 mg/L) in distant ponds. The U.S. Environmental Protection Agency (EPA) National Criteria for Protection of Aquatic Life are 0.011 mg/L for hexavalent chromium and 0.21-0.37 mg/L for trivalent chromium at hardnesses of 100-200 mg/L during chronic exposures (EPA 1986). The form of the chromium in our study is unknown, since only total chromium was measured. EPA (1984) found that a significant portion of the chromium present in two of six drill muds was in the hexavalent form and that about half of this form remained in the liquid versus solid test phase. Hexavalent chromium is soluble and stable in most well-oxygenated natural waters; its toxicity effects are little influenced by hardness (EPA 1980a). On the other hand, trivalent chromium is rapidly hydrolyzed, precipitated, and sorbed in hard waters. Thus, some of the chromium sampled may have been hexavalent.

Arsenic, although apparently much less readily dispersed (Figure 5), still appears to be increased in ponds adjacent to pits and in connected distant ponds. More important, arsenic showed a strong negative correlation with taxonomic richness and H' diversity in tundra ponds, even though arsenic generally occurred at much lower levels in ponds than EPA's established chronic toxicity criterion for protection of freshwater life. The level for trivalent arsenic was established as 0.19 mg/L (EPA 1986). The results may reflect local sensitivity or a covariance relation. Arsenic concentrations were strongly correlated with levels of barium (r = 0.81), alkalinity (r = 0.89), turbidity (r = 0.62), and hardness (r = 0.72). Like chromium, arsenic poses a concern because its toxic effects—especially its chronic toxic effects such as slowed reproduction, and growth and enzyme inhibition. Biomagnification in the food web is of lesser concern (EPA 1980b).

Barium is another metal of concern, since there is evidence for its dispersion from adjacent ponds to distant ponds (Figure 5), and since barium levels were strongly correlated with turbidity, alkalinity, and hardness in our ponds. The probable effects of barium include interference with filter feeding and respiration and increased turbidity, producing a possible decrease in the primary productivity of affected waters. Another important detrimental physical change may occur in the sediment, since the grain size of barite is fine and may result in the physical smothering of benthic organisms. Indeed, most secondary production in tundra ponds is from chironomid larvae, which are primarily benthic (Hobbie 1973; Butler et al. 1980). Hence, indirect toxic effects may be expected, although direct toxicity from barium at the concentrations reported here is unlikely (National Research Council 1983). Indirect effects may explain why barium concentrations were negatively correlated with the total number of taxa and with H' diversity of the ponds.

By the very nature of regression analysis, the correlations demonstrated in this study cannot definitively establish cause and effect between chemical and biological variables. Water quality variables or contaminants not examined in this study may also play a role in determining decreases in diversity or abundance. Our analyses should not be used to establish the relative importance of specific contaminants or water quality variables, since they were measured at only one point in time, whereas the biological community obviously reflects long-term as well as short-term conditions. In particular, the relative importance of hydrocarbons could well have been underestimated, since some of these compounds could have volatilized or been biologically degraded during the period between discharge and sampling.

Another limitation of the analysis is that it cannot be used to identify the source of the contaminants. Although recent discharge of reserve pit fluids was the most likely source of deteriorating water quality of ponds in the vicinity of the reserve pits, other possible sources exist: earlier events of overtopping or breaching of reserve pit walls and subsequent surface flooding; persistent seepage from pits; unreported oil or wastewater spills during drilling operations; and contamination from fill material in gravel spilled and bulldozed from the drill site to receiving ponds. We reviewed field notes and photographs of the adjacent ponds to estimate the extent of gravel at each site. We found no significant positive or negative correlations between estimates of surface area covered by gravel and any water quality, contaminant, or biological variable.

Therefore, reserve pit fluid contamination is considered the most likely source of most contaminants and water quality changes. Numerous studies have established that barium and chromium are excellent tracers for the fate of drill fluids (Gettlesen and Laird 1980; Chow and Snyder 1980; Kalil 1980; Liss et al. 1980). Similarly, increased salinity, total dissolved solids, hardness, and alkalinity have been recorded at a stream site receiving oily field discharge water (Woodward and Riley 1983).

Despite the shortcomings of discriminant, regression, and other analyses in indicating cause and effect, these analyses are widely recognized as valuable in helping to forecast effects. Thus, waters with high turbidity, alkalinity, chromium, arsenic, or barium that are discharged or seep into tundra ponds will probably result in decreased taxonomic diversity and abundance in the receiving pond and more limited detrimental effects in other ponds with connections to the receiving ponds. Therefore, reserve pit effluent should meet standards established for each of these variables to reduce the likelihood of biological impacts. Also, the possible cumulative effect of multiple discharges at the same location should be considered, since arsenic, salts, and metals could be expected to accumulate in lentic systems over time.

Although the variables described above would be highly useful in predischarge monitoring, we remain concerned that predischarge monitoring of metals and hydrocarbons will result in the reduction of direct tundra discharges, but cause an increase in disposal of reserve pit fluids by way of road treatment in the name of dust control. In 1983 and 1984, such road watering involved contaminated pit fluids that failed direct-discharge tests, and may have resulted in contaminants being spread over an even wider area of tundra wetlands.

As long as reserve pits fill in the spring, some type of draining will be necessary. Ideally, industry and agency efforts should concentrate on achieving reinjection of reserve pit fluids into the permafrost strata of wells. Alternatively, some measure of protection could be achieved by lessening the need for dewatering. Progress toward this goal could be made in several ways: by enacting conservation measures applicable to drilling fluids; by developing and implementing technologies that reduce mud fluid volumes; by designing pits to limit snow-drift accumulation; by building deeper pits that cover less total area; by manually disposing of snow contaminated with crude and other pollutants, before general snow removal from the pad; and by careful planning of the use of each pit. Coupled with predischarge monitoring for contaminants or the institution of pollution control technologies, such a program should greatly improve the protection afforded wildlife and wildlife habitat on the North Slope.

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Table 1. Water quality variables versus treatment. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Chi-square (X^2) and probability (P) levels are from a Friedman two-way analysis of variance within and between drill sites. Control ponds were excluded from this analysis.

Variable	Treatment means				X^2	P
	1	2	3	4		
pH	7.61	7.93	7.89	8.36	7.00	.03*
Conductivity (umhos/cm)	4000	2608	5358	5992	7.58	.02*
Dissolved oxygen (mg/L)	10.0	9.7	8.7	6.8	6.08	.05*
Hardness (mg/L)	185	297	673	240	6.33	.04*
Alkalinity (mg/L)	52	144	433	332	8.33	.02*
Turbidity (NTU)	0.6	1.2	9.4	40.8	12.00	.003**
Water depth (cm)	15.4	15.5	15.2	-	-	-
Sediment depth (cm)	33.2	35.9	40.5	-	-	-
Water temperature (°C)	7.3	8.7	8.8	7.0	9.08	.01*

* $P \leq .05$.

** $P \leq .01$.

Table 2. Classification showing predicted versus actual group (treatment) membership based on discriminant analysis of water quality measurements.

Actual group	Number of sites	Predicted group membership 1	2	3	4
1	3	3 100%	0 0%	0 0%	0 0%
2	6	1 17%	5 83%	0 0%	0 0%
3	6	0 0%	1 17%	4 67%	1 17%
4	6	0 0	0 0	0 0	6 100%

Percent of sites correctly classified: 86%

TABLE 3. Kruskal-Wallis comparisons of water quality in pond treatments. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Asterisk(s) show the probability ($P \leq .05$ or $.01$) of significantly lower values in the first treatment specified.

	Treatment Comparison					
	1,3		1,2		2,3	
Characteristic	X^2	P	X^2	P	X^2	P
pH	0.85	.36	1.74	.19	0.54	.46
Conductivity	0.60	.44	0.42	.52	3.69	.05*
Dissolved O_2	0.43	.51	0.02	.90	0.33	.57
Hardness	4.89	.03*	1.67	.20	5.04	.02*
Alkalinity	5.40	.02*	4.94	.03*	8.37	.004**
Turbidity	5.40	.02*	2.84	.09	7.41	.006**
Temperature	1.38	.24	1.10	.29	0.03	.87
Water depth	0	1.00	0.07	.80	0.03	.87
Sediment depth	3.27	.07	1.07	.30	1.45	.23

Table 4. Metal and hydrocarbon concentrations versus treatment. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Chi-square (X^2) and probability (P) levels are from a Friedman two-way analysis of variance within and between drill sites. Control ponds were excluded from this analysis.

Variable	Treatment means (mg/L)				X^2	P
Metal	1	2	3	4		
Al	0.46	1.04	0.48	31.8	10.33	.006**
As	0.001	0.001	0.004	0.023	6.75	.03*
Ba	ND[a]	0.13	0.69	1.62	2.33	.31
Cd	0.0002	0.001	ND[a]	0.001	0.75	.69
Cr	ND[a]	0.070	0.084	0.118	2.33	.31
Cu	0.001	0.002	0.008	0.006	2.58	.27
Ni	0.003	0.036	0.044	0.043	1.58	.45
Pb	0.004	0.006	0.004	0.026	1.75	.42
Zn	0.001	0.039	0.026	0.124	5.58	.06
Hydrocarbons						
Aliphatic	0.006	0.001	0.003	0.401	9.33	.009*
Aromatic	0.0003	0.001	0.001	0.013	2.58	.27

* $P \leq .05$.

** $P \leq .01$.

[a] ND denotes none detected.

Table 5. Kruskal-Wallis comparisons of contaminant levels in pond treatments. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Asterisk(s) show the probability ($P \leq .05$ or $.01$) of significantly lower values in the first treatment specified.

	Treatment Comparison					
	1,3		1,2		2,3	
Variable	X^2	P	X^2	P	X^2	P
Lead	0.09	.76	0.08	.78	0.13	.72
Copper	2.03	.15	1.36	.24	1.64	.20
Zinc	0.32	.57	1.82	.18	0.69	.41
Cadmium	4.50	.04[a]	1.15	.28	1.00	.32
Chromium	5.59	.02*	4.09	.04*	0.23	.63
Barium	4.09	.04*	0.50	.48	3.22	.07
Arsenic	4.30	.04*	0.09	.76	5.61	.02*
Nickel	5.45	.02*	1.16	.28	1.65	.20
Aluminum	0.02	.90	0.82	.36	0.79	.37
Aromatics	0.28	.60	0.32	.57	1.43	.23
Aliphatics	1.07	.30	5.40	.02[b]	1.44	.23

[a] Treatment 1 values significantly higher than treatment 3.

[b] Treatment 1 values significantly higher than treatment 2.

Table 6. Invertebrate population variables versus treatment. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Chi-square (X^2) and probability (P) levels are from a Friedman two-way analysis of variance within and between drill sites. Control ponds were excluded from this analysis.

Community variables	Treatment means				X^2	P
	1	2	3	4		
Total taxa	11.3	7.2	3.30	0	11.08	.004**
Total abundance of organisms	185	1617	510	0	9.00	.01**
Taxonomic diversity (H')	0.66	0.46	0.14	0	12.00	.003**
Total abundance of dipterans	30	13	49	0	9.25	.01**
Total abundance of other insects	43	3	0	0	6.25	.04*
Total abundance of crustaceans	100	1594	0.1	0	7.00	.03*

* $P \leq .05$.

** $P \leq .01$.

Table 7. Classification showing predicted versus actual group (treatment) membership based on discriminant analysis of biological measurements.

Actual group	Number of sites	Predicted group membership 1	2	3	4
1	3	3 100%	0 0%	0 0%	0 0%
2	6	2 33%	4 67%	0 0%	0 0%
3	6	0 0%	0 0%	5 83%	1 17%
4	6	0 0	0 0	0 0	6 100%

Percent of sites correctly classified: 86%

TABLE 8. Kruskal-Wallis comparisons of biological measures in pond treatments. Treatments include control ponds (1), distant ponds (2), receiving ponds (3), and reserve pits (4). Asterisk(s) show the probability ($P \leq .05$ or .01) of significantly higher values in the first treatment specified.

	Treatment Comparison					
	1,3		1,2		2,3	
Variable	χ^2	P	χ^2	P	χ^2	P
Total taxa	5.59	.02*	4.90	.03*	7.13	.008**
H' diversity	5.40	.02*	1.67	.20	5.03	.03*
Total abundance	5.45	.02*	0.60	.44	0.10	.75
Crustacea	5.63	.02*	0.60	.44	4.17	.04*
Diptera	1.07	.30	2.40	.12	5.77	.02[a]
Other insects	7.62	.006**	1.74	.19	7.24	.007**

[a] Treatment 2 abundance is significantly higher than treatment 3.

Table 9. Correlation coefficients (r values) from simple linear regressions of water quality, metal levels, and hydrocarbon concentrations on invertebrate community measures. These regressions were performed using pond data only (pits excluded). For each analysis, the sample size (N) is 15.

	R value					
Variable	Total taxa	Total organisms[a]	Composite diversity H'	Dipteran abundance	Crystacean abundance[a]	Other insect abundance
WATER QUALITY						
pH	-.2795	.3977	-.3993	.1450	.1103	-.5112
Salinity	.0430	.2899	-.3507	.4168	-.1180	.5502*
Dissolved oxygen	-.1699	-.0631	.2508	-.2462	-.1647	.2176
Hardness	-.5487*	.0356	-.6929**	.2659	-.1649	-.1469
Alkalinity	-.6887**	-.2436	-.6404*	.3226	-.2755	-.3155
Turbidity	-.3530	-.3686	-.1802	-.1931	-.0466	-.1308
Temperature	-.4583	.1030	-.3703	.3792	-.3721	-.4747
METAL						
Barium	-.5529*	-.1020	-.5569*	.0139	-.0755	-.2465
Chromium	-.3490	.1967	-.4714	.3639	-.0738	-.2991
Arsenic	-.6424**	-.3274	-.5238*	.2232	-.2656	-.3189
Lead	+.2263	-.2621	.3089	-.4404	-.0863	.5159*
HYDROCARBONS						
Aliphatics (total)	.2790	-.1192	.2289	.1008	-.0477	.2865
Aromatics (total)	-.3987	.1186	-.4540	.3341	-.2742	.2670

[a] log-transformed abundance.
* $p \angle .05$.
** $p \underline{Z} .01$.

APPENDIXES

Table A-1. Prudhoe Bay sample collection data and treatment designation June 7 - August 8, 1983.[a]

Sample number	Sample sites[b]	Treatment number[c]	Date
1	ARCO Drill Site 6 (pit)	-	Jun 7
2	ARCO Drill Site 16 (pit)	-	Jun 6
3	ARCO Drill Site 18 (pit)	-	Jun 6
4	SAPC Pad A (pit)	-	Jun 8
5	SAPC Pad E (pit)	-	Jun 7
6	SAPC Pad N (pit)	-	Jun 8
7	Pad N (pit)	4	Jul 27
8	Pad N (adjacent pond)	3	Jul 27
9	Pad N (distant pond)	2	Jul 27
10	Drill Site 6 (pit)	4	Jul 28
11	Drill Site 6 (adjacent pond)	3	Jul 28
12	Drill Site 6 (distant pond)	2	Jul 28
13	Drill Site 16 (pit)	4	Jul 28
14	Drill Site 16 (adjacent pond)	3	Jul 28
15	Drill Site 16 (distant pond)	2	Jul 28
16	Pad A (pit)	4	Jul 29
17	Pad A (adjacent pond)	3	Jul 29
18	Pad A (distant pond)	2	Jul 29
19	Pad E (pit)	4	Jul 29
20	Pad E (adjacent pond)	3	Jul 29
21	Pad E (distant pond)	2	Jul 29
22	Drill Site 18 (pit)	4	Jul 30
23	Drill Site 18 (adjacent pond)	3	Jul 30
24	Drill Site 18 (distant pond)	2	Jul 30
25	Oliktok (control 1)	1	Jul 31
26	Oliktok (control 2)	1	Jul 31
27	Pad E (control 3)	1	Aug 1

[a] See Figure 2 for locations of sampling sites.

[b] Drill sites are termed drill sites by ARCO and pads by SAPC.

[c] For statistical analyses, the following numbers were used as treatments: reserve pits, 4; adjacent receiving ponds, 3; distant ponds linked to receiving ponds, 2; and remote control ponds, 1. Samples 1-6 were also reserve pits, but these June samples were not included in the statistical analyses.

Table B-1. Site characteristics, Prudhoe Bay, Alaska, June-August 1983.

Sample number	Treatment number	Water temp. (°C)	pH	Conductivity (umhos)/cm	Salinity (°/oo)	Dissolved Oxygen (mg/L)	Hardness (mg/L)	Alkalinity (mg/L)	Turbidity (NTU)	Water depth (mm)	Sediment depth (mm)
1	4	1	8.1	1100	1	-	-	-	-	-	-
2	4	0	7.5	280	0	-	-	-	-	-	-
3	4	3	9.2	1350	1	-	-	-	-	-	-
4	4	1	8.1	350	1	-	-	-	-	-	-
5	4	1	8.3	1400	1.5	-	-	-	-	-	-
6	4	3	7.8	950	.9	-	-	-	-	-	-
7	4	7	8.4	3650	3	9	346	104	23	-	-
8	3	10	8.3	4800	4	13	797	277	2	169	407
9	2	9	7.3	1500	1	10	191	156	1.2	52	321
10	4	5	8.8	8000	6.5	7	156	502	42	-	-
11	3	6	7.7	8000	6.5	3	953	658	4	262	321
12	2	6	8.3	3200	3	12	364	156	1	258	322
13	4	8	8.4	3800	3.5	10	87	433	38	-	-
14	3	9	7.9	3000	2	10	346	416	2.9	97	475
15	2	9	8.0	2100	1.5	11	173	121	0.54	140	340
16	4	8	8.0	7500	6	3	294	242	56	-	-
17	3	10	7.9	7000	5	9	468	346	3.9	142	343
18	2	10	7.7	1350	1	10	156	69	2.1	234	370
19	4	9	8.1	7000	6	6	294	277	28	-	-
20	3	12	7.9	6500	5	10	468	294	2.5	154	401
21	2	11	8.3	4400	3.5	7	675	242	1.8	102	388
22	4	5	8.5	6000	5	6	260	433	58	-	-
23	3	6	7.6	2850	2.5	7	1004	606	41	89	481
24	2	7	8.0	3100	2.5	8	225	121	0.8	143	410
25	1	8	8.0	1150	.7	10	87	35	0.38	135	389
26	1	9	7.6	1350	1	9	121	52	0.62	121	313
27	1	5	7.2	9500	8	11	346	69	0.84	206	295

Table C-1. Aquatic macroinvertebrates and code designations for taxa from Prudhoe Bay sample sites, July-August 1983.[a]

	Code
Class - Hydrozoa	
Order - Hydroida	
Family - Hydridae	O
Phylum - Nematoda	L
Class - Oligochaeta	
Family - Tubificidae	R
Family - Enchytraeidae	
Class - Crustacea	
Subclass - Branchiopoda	
Order - Anostraca	G
Order - Notostraca	K
Order - Cladocera	
Family - Daphnidae	C
Order - Copepoda	
Suborder - Calanoida	B
Suborder - Cyclopoida	S
Order - Ostracoda	F
Class - Arachnida	
Order - Acari (Hydracarina)	
Class - Insecta	
Family - Lebertiidae	I
Order - Collembola	P
Order - Ephemeroptera	
Family - Baetidae	U
Family - Siphlonuridae	D
Order - Plecoptera	
Family - Nemouridae	E
Order - Trichoptera	
Family - Limnephilidae	M
Order - Coleoptera	
Family - Dytiscidae	T
Order - Hemiptera	
Family - Pleidae	V
Order - Diptera	
Family - Chironomidae	A
Family - Culicidae	H
Family - Dixidae	J
Family - Tipulidae	Q
Class - Gastropoda	
Order - Pulmonata	
Family - Physidae	N

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[a] Nomenclature based on Pennak (1978).

Table C-2. (Continued)

Sample number	Sweep sample no.	Number of taxa	Average number	Number of individuals/ taxon (see Table C-1 code)
17	1	3	3	(34)A, (2)N, (2)S
	2	3		(40)A, (4)N, (1)I
	3	4		(42)A, (1)N, (1)C, (1)T
18	1	4	4	(34)B, (4)G, (2)C, (1)M
	2	3		(32)B, (5)G, (2)C
	3	4		(26)B, (4)G, (3)C, (1)K
20	1	2	2	(107)A, (5)H
	2	3		(78)A, (4)H, (1)Q
	3	1		(97)A
21	1	7	6	(10,640)C, (354)S, (31)A (26)F, (17)B, (3)P, (2)H;
	2	5		(9,350)C, (183)S, (22)A, (15)B, (3)F;
	3	7		(6,675)C, (122)S, (28)A (10)B, (4)F, (3)T, (2)H
23	1	2	2	(14)A, (3)C
	2	3		(5)A, (2)C, (1)S
	3	2		(3)A, (1)C
24	1	9	6	(33)A, (26)N, (4)F, (3)Q, (3)M, (3)P, (2)R, (1)I, (1)L;
	2	4		(48)A, (29)N, (2)F, (1)M;
	3	6		(30)A, (20)N, (2)F, (2)M, (1)C, (1)R

(Continued)

Table C-2. (Concluded)

Sample number	Sweep sample no.	Number of taxa	Average number	Number of individuals/ taxon (see Table C-2, key)
25	1	10	9	(39)B, (35)C, (26)A, (19)E, (3)D,(2)G, (1)F, (1)O, (1)J, (1)P;
	2	6		(34)C, (30)A, (30)B, (14)E, (2)J, (1)P;
	3	11		(34)C, (23)A, (15)B, (7)E, (5)J, (2)M, (2)F, (1)P, (1)Q, (1)R, (1)G
26	1	7	8	(19)A, (10)G, (7)C, (3)N (3)E, (1)M, (1)F;
	2	6		(109)C, (86)A, (6)B, (4)G (2)N, (1)F;
	3	10		(24)A, (20)B, (19)C, (10)G, (4)N, (1)D, (1)E, (1)I, (1)M, (1)J
27	1	13	12	(159)U, (156)B, (19)E, (16)A, (13)F, (12)C, (4)G, (3)P, (3)D, (2)J, (2)M, (2)T, (1)V;
	2	13		(127)B, (30)U, (21)A, (20)F (12)C, (10)M, (8)E, (4)N, (3)G, (2)P, (1)I, (1)O, (1)H;
	3	11		(154)U, (139)B, (26)C, (20)E, (17)A, (5)M, (5)F, (3)T, (1)N, (1)G, (1)V

[a] No invertebrate sampling occurred for samples 1-6. Invertebrates were absent from reserve pits sample numbers 7, 10, 13, 16, 19 and 22 in the July-August sample period.

[b] Average number of taxa per sweep set. Statistical treatment used total number of taxa (see text).

Table D-1. Results of preliminary analyses for heavy metals, Prudhoe Bay reserve pit samples, June 1983.[a]

Sample site	Lead	Copper	Zinc	Nickel	Cadmium	Barium	Chromium	Mercury	Arsenic	Aluminum
1	0.094	0.25	0.20	ND	0.0008	2.8	0.65	ND	0.020	15.0
2	0.20	0.029	0.078	0.036	ND	1.2	0.37	ND	0.010	12.0
3	0.18	0.12	0.87	0.090	ND	10.0	0.75	ND	0.033	18.0
4	0.17	0.21	0.69	0.05	0.0087	5.0	0.12	0.0006	0.020	11.0
5	0.014	0.0084	0.053	0.019	ND	ND	0.13	ND	0.004	5.3
6	0.0037	ND	0.69	ND	ND	ND	0.048	ND	0.0017	5.6

[a] Results are in mg/L, or (parts per million ppm), wet weight. The lower detection limits (mg/L) were 0.005 for aluminum and nickel; 0.05 for barium; 0.0005 for lead, copper, and chromium; 0.0001 for zinc and cadmium; 0.0004 for mercury; and 0.001 for arsenic and selenium. No selenium was detected in any sample. ND = not detected.

Table D-2. Preliminary observations of reserve pit dewatering and presence of oil and drill muds, Prudhoe Bay, Alaska, June 1983.[a]

Location	Oil visible in pit	Drill muds visible in pit	Evidence of dewatering	Discharge location[b]
DS-1	Y	Y	Y	R
DS-2	N	N	Y	R
DS-3	N	N	N	-
DS-4	N	Y	N	-
DS-5	N	N	N	-
DS-6	Y	Y	Y	R
DS-7	Y	Y	Y	R
DS-9	N	N	N	-
DS-11	N	N	N	-
DS-12	Y	Y	N	-
DS-13	N	Y	Y	R
DS-14	Y	Y	Y	T&R
DS-15	N	Y	Y	R
DS-16	N	N	Y	T&R
DS-17	N	N	Y	T
DS-18	Y	Y	Y	R
Pad A	Y	N	Y	T&R
Pad B	Y	Y	Y	T
Pad C	Y	Y	N	-
Pad D	Y	Y	Y	T
Pad E	N	N	Y	T
Pad F	N	N	Y	R
Pad G	N	Y	Y	T
Pad H	Y	Y	Y	R
Pad J	N	Y	N	-
Pad M	Y	Y	N	-
Pad N	Y	Y	Y	T
Pad Q	Y	Y	N	-
Pad R	Y	Y	Y	T
Pad T	N	N	N	-
Pad U	N	N	N	-
Pad X	Y	Y	Y	T&R
Pad Y	Y	Y	N	-
	17 Y (52%) 16 N	21 Y (64%) 12 N	20 Y (61%) 13 N	9 R (27%) 7 T (21%) 4 T&R (12%)

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[a] N = No; Y = Yes.

[b] T = direct tundra discharge; R = discharge on roads and pads by spraying from a tanker or overtopping.

Table E-1. Results of heavy metals analyses, Prudhoe Bay reserve pit samples, July-August 1983.[a]

Sample site	Lead	Copper	Zinc	Cadmium	Chromium	Arsenic	Nickel	Aluminum	Barium
7	0.0052	0.0059	0.056	ND	0.088	0.0053	0.022	2.6	0.92
8	ND	0.029	ND	ND	0.11	0.0029	0.018	1.1	0.66
9	0.023	0.0035	0.012	ND	0.05	0.0028	0.014	1.4	ND
10	0.018	0.016	0.21	ND	0.12	0.050	0.13	97	4.4
11	ND	0.0043	0.080	ND	0.21	0.0054	0.088	ND	0.67
12	0.0033	0.0046	0.12	0.00056	0.049	ND	0.17	2.5	ND
13	0.0008	0.0052	0.33	0.0009	0.21	0.030	0.086	69	3.9
14	0.0064	0.0041	0.069	ND	0.078	0.0053	0.016	1.3	0.59
15	ND	0.00062	0.082	ND	0.021	ND	0.007	0.46	ND
16	ND	ND	0.046	ND	0.12	0.016	0.015	2.7	ND
17	ND	ND	ND	ND	0.057	0.0023	0.011	ND	0.61
18	0.0042	0.0011	0.019	ND	ND	ND	ND	1.3	ND
19	0.093	0.003	0.098	ND	0.16	0.038	0.005	13	0.52
20	ND	0.0059	ND	ND	0.030	0.0015	0.026	1	ND
21	ND	0.0009	ND	ND	0.13	0.0028	0.024	ND	0.77
22	0.037	0.0025	ND	0.00013	0.0042	ND	ND	9	ND
23	0.014	0.0023	0.0039	ND	0.018	0.0064	0.101	0.53	1.6
24	ND	0.0015	ND	ND	0.17	ND	ND	0.6	ND
25	ND	0.00058	ND	ND	ND	ND	ND	0.036	ND
26	ND	0.0025	0.0039	0.00017	ND	0.0017	0.008	1.3	ND
27	0.020	ND	ND	0.00020	ND	ND	ND	0.03	ND

[a] Results are in mg/L, or parts per million (ppm), wet weight. The lower detection limits (mg/L) were 0.005 for aluminum and nickel; 0.05 for barium; 0.0005 for lead, copper, and chromium; 0.0001 for zinc and cadmium; 0.0004 for mercury; and 0.001 for arsenic and selenium. No mercury or selenium was detected in any of the samples. ND = not detected.

Table F-1. Results of preliminary hydrocarbon analyses, Prudhoe Bay reserve pit samples, June 1983.[a]

	Sample site numbers					
ALIPHATICS	1	2	3	4	5	6
Dodecane	0.11	ND	0.031	630	0.0050	0.0029
Tridecane	0.51	ND	0.067	1000	0.0092	0.014
Tetradecane	1.4	0.00068	0.14	1100	0.013	0.052
Octylcyclohexane	0.30	ND	0.012	110	0.0026	0.0032
Pentadecane	2.6	ND	0.31	1200	0.015	0.097
Nonylcyclohexane	0.51	ND	0.038	210	0.0028	0.0095
Hexadecane	2.8	ND	0.41	930	0.0080	0.077
Heptadecane	1.9	ND	0.33	570	0.0064	0.052
Pristane	1.5	ND	0.31	540	0.0052	0.043
Octadecane	1.2	ND	0.31	350	0.0052	0.029
Phytane	1.07	ND	0.17	210	0.0026	0.020
Nonadecane	0.61	ND	0.19	160	0.0023	0.0097
Eicosane	0.35	ND	0.15	59	0.0011	0.0037
AROMATICS						
Naphthalene	0.0054	ND	0.0059	16	ND	ND
Fluorene	0.35	ND	0.11	57	ND	0.0025
Phenanthrene	0.37	ND	0.15	57	ND	0.0023
Anthracene	0.30	ND	0.12	59	ND	0.0027
Fluoranthene	0.37	ND	0.12	ND	ND	ND
Pyrene	0.23	ND	0.23	ND	ND	ND
1,2-Benzanthracene	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND
Benzo(e)pyrene	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND	ND
1,2,5,6-Dibenzanthracene	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND

[a] Results are in mg/L, or parts per million (ppm), wet weight. The lower limit of reportable residues = 0.0003 mg/L. ND = not detected.

Table F-2. Results of hydrocarbon analyses, Prudhoe Bay, July-August 1983.[a]

	Sample site numbers					
	7	8	9	10	11	12
Aliphatics						
Dodecane	0.074	0.00036	0.0012	0.17	0.00010	0.00034
Tridecane	0.10	0.00034	ND	0.22	ND	ND
Tetradecane	0.091	0.00023	0.000890	0.077	0.00027	ND
Octylcyclohexane	0.017	ND	ND	0.027	ND	ND
Pentadecane	0.094	0.00068	ND	0.091	0.00039	ND
Nonylcyclohexane	0.018	ND	ND	0.025	ND	ND
Hexadecane	0.077	0.00090	ND	0.068	0.00090	ND
Heptadecane	0.055	0.00058	ND	0.0095	0.00054	ND
Pristane	0.036	0.00039	ND	0.014	0.00051	ND
Octadecane	0.034	0.00032	ND	0.012	0.00044	ND
Phytane	0.026	ND	ND	0.013	0.00023	ND
Nonadecane	0.016	0.00027	ND	0.015	0.00036	ND
Eicosane	0.006	ND	ND	0.015	0.00029	ND
Aromatics						
Naphthalene	0.0034	0.0010	ND	0.0018	ND	ND
1-Methylnaphthalene	0.0070	ND	ND	0.0059	ND	ND
2-Ethylnaphthalene	0.0023	ND	ND	0.00050	ND	ND
1,5-Dimethylnaphthalene	0.0021	ND	ND	0.0012	ND	ND
4-Phenyltoluene	0.0024	ND	ND	ND	ND	ND
1,3,5-Trimethylnaphthalene	0.0110	ND	ND	ND	ND	ND
Fluorene	0.0062	ND	ND	0.0026	ND	ND
Phenanthrene	0.0031	ND	ND	0.0086	ND	ND

(Continued)

Table F-2. (Continued)

	13	14	15	16	17	18
Aliphatics						
Dodecane	0.0012	ND	0.00080	0.00065	0.00022	0.00068
Tridecane	0.00040	ND	ND	0.00021	0.00015	ND
Tetradecane	0.0015	ND	0.00054	0.00090	0.00066	0.00022
Octylcyclohexane	ND	ND	ND	ND	ND	ND
Pentadecane	0.0012	0.00020	ND	0.0012	0.00057	ND
Nonylcyclohexane	ND	ND	ND	ND	ND	ND
Hexadecane	0.0013	0.00028	ND	0.0019	0.00082	ND
Heptadecane	0.00075	0.00019	ND	0.0018	0.00080	ND
Pristane	0.00068	0.00020	ND	0.0019	0.00082	ND
Octadecane	0.00026	ND	ND	0.0018	0.00048	ND
Phytane	ND	ND	ND	0.0012	0.00032	ND
Nonadecane	ND	ND	ND	0.0011	0.00037	ND
Eicosane	ND	ND	ND	0.00043	0.00034	ND
Aromatics						
Naphthalene	0.00013	ND	0.00049	0.00034	0.00021	ND
1-Methylnaphthalene	ND	ND	ND	0.00056	0.00075	ND
2-Ethylnaphthalene	ND	ND	ND	ND	ND	ND
1,5-Dimethylnaphthalene	ND	ND	ND	0.00059	0.00014	ND
4-Phenyltoluene	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylnaphthalene	ND	ND	ND	ND	0.00027	ND
Fluorene	ND	ND	ND	0.0029	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND

(Continued)

Table F-2. (Continued)

	19	20	21	22	23	24
ALIPHATICS						
Dodecane	0.036	ND	ND	0.11	ND	0.0014
Tridecane	0.074	ND	ND	0.13	ND	ND
Tetradecane	0.051	ND	ND	0.10	0.00040	0.00093
Octylcyclohexane	0.019	ND	ND	0.026	ND	ND
Pentadecane	0.034	ND	ND	0.096	0.00058	ND
Nonylcyclohexane	0.016	ND	ND	0.019	ND	ND
Hexadecane	0.044	ND	ND	0.073	0.00070	0.00023
Heptadecane	0.0078	ND	ND	0.026	0.00079	ND
Pristane	0.0065	ND	0.00052	0.041	0.0011	ND
Octadecane	0.0046	ND	0.00031	0.025	ND	ND
Phytane	0.0031	ND	ND	0.011	ND	ND
Nonadecane	0.0020	ND	ND	0.015	ND	ND
Eicosane	0.00083	ND	ND	0.013	ND	ND
AROMATICS						
Naphthalene	0.00016	0.0016	0.0015	0.0015	0.0017	ND
1-Methylnaphthalene	ND	ND	ND	0.0046	ND	ND
2-Ethylnaphthalene	ND	ND	ND	0.00031	ND	ND
1,5-Dimethylnaphthalene	0.0012	ND	ND	0.0012	ND	ND
4-Phenyltoluene	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylnaphthalene	ND	ND	ND	0.0022	ND	ND
Fluorene	ND	ND	ND	0.0010	ND	ND
Phenanthrene	ND	ND	ND	0.0068	ND	ND

(Continued)

Table F-2. (Concluded)

	25	26	27	28
Aliphatics				
Dodecane	0.0017	0.0024	0.0015	0.00084
Tridecane	ND	0.0010	0.00063	0.00019
Tetradecane	0.0013	0.0033	0.0024	0.0011
Octylcyclohexane	ND	ND	ND	ND
Pentadecane	ND	0.00077	0.00022	0.00015
Nonylcyclohexane	ND	0.00015	0.00074	ND
Hexadecane	0.00031	0.0012	ND	0.00030
Heptadecane	ND	ND	ND	ND
Pristane	ND	ND	ND	ND
Octadecane	ND	ND	ND	ND
Phytane	ND	ND	ND	ND
Nonadecane	ND	ND	ND	ND
Eicosane	ND	ND	ND	ND
Aromatics				
Naphthalene	ND	0.00050	ND	0.00039
1-Methylnaphthalene	0.00027	0.00019	ND	0.00027
2-Ethylnaphthalene	ND	ND	ND	ND
1,5-Dimethylnaphthalene	ND	ND	ND	ND
4-Phenyltoluene	ND	ND	ND	ND
1,3,5-Trimethylnaphthalene	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND

[a] All results are in mg/L, or parts per million (ppm), wet weight. The lower limit of reportable residues = 0.0003 ppm. ND = not detected.

Table G-1. Computer printout of stepwise discriminant analysis of water quality variables by treatment.

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACM   ACAD3                                  DEC VAX-8800   VMS V4.4

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP  1,  TURB     WAS INCLUDED IN THE ANALYSIS.

                                  DEGREES OF FREEDOM            SIGNIF.        BETWEEN GROUPS

WILKS' LAMBDA          0.27179   1    3         17.0
EQUIVALENT F          15.1827         3         17.0            0.0000

------------------VARIABLES IN THE ANALYSIS AFTER STEP 1 ---------------------------

VARIABLE      TOLERANCE        F TO REMOVE     WILKS'LAMBDA

TURB          1.0000000          15.183

------------------VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 ------------------------

                              MINIMUM
VARIABLE      TOLERANCE      TOLERANCE            F TO ENTER           WILKS' LAMBDA

PH            0.9649363      0.9649353            2.9970               0.18278
COND          0.9959490      0.9959490            1.4495               0.21371
DO            0.8569348      0.8569348            0.80566E-01          0.26775
HARD          0.9069145      C.9069145            7.3180               0.11458
ALK           0.7510666      0.7510666            8.8660               0.10209
TEMP          0.8341398      0.8341398            0.82962              0.23520

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 1
EACH F STATISTIC HAS 1 AND 17.0 DEGREES OF FREEDOM.

                  GROUP      1                  2                   3

   GROUP

       2                 0.61394E-02
                         0.9385

       3                 1.1800             1.5250
                         0.2924             0.2337

       4                 24.776             36.083              22.709
                         0.0001             0.0000              0.0002
```

```
30-SEP-86       DATA VERIFICATION
13:22:34        VACN   ACAD3                                              DEC VAX-8800   VMS V4.4

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP  2,   ALK    WAS INCLUDED IN THE ANALYSIS.

                                        DEGREES OF FREEDOM              SIGNIF.        BETWEEN GROUPS

WILKS' LAMBDA            0.10209   2    3         17.0
EQUIVALENT F            11.3590         6         32.0               0.0000

------------------VARIABLES IN THE ANALYSIS AFTER STEP 2 ------------------------------

VARIABLE       TOLERANCE       F TO REMOVE     WILKS'LAMBDA

ALK            0.7510666          8.8660         0.27179
TURB           0.7510666         14.736          0.38415

------------------VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 ---------------------------

                               MINIMUM
VARIABLE       TOLERANCE      TOLERANCE           F TO ENTER          WILKS' LAMBDA

PH             0.9514791      0.7146603           2.5369              0.06772
COND           0.9398731      0.7087779           1.0758              0.08401
DO             0.7440313      0.6521115           0.27959             0.09668
HARD           0.8530345      0.7064455           1.8313              0.07472
TEMP           0.6550375      0.5906117           2.3107              0.06982


F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 2
EACH F STATISTIC HAS 2 AND 16.0 DEGREES OF FREEDOM.

               GROUP      1                   2                       3

   GROUP

      2                 0.64404
                        0.5383

      3                 9.9995              8.0211
                        0.0018              0.0039

      4                11.972              17.030                  19.676
                        0.0007              0.0001                  0.0000

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.
```

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACN   ACAD3                                  DEC VAX-8600   VMS V4.4

                                        SUMMARY TABLE

            ACTION            VARS     WILKS'
STEP ENTERED REMOVED           IN      LAMBDA          SIG.        LABEL

  1 TURB                       1       .27179          .0000
  2 ALK                        2       .10209          .0000

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

TRT      =          1                    2                    3                    4

ALK            0.4217583E-02        0.1189447E-01        0.3304993E-01        0.9579615E-02
TURB          -0.1824537E-01       -0.5496690E-01       -0.1071466            0.2606257
(CONSTANT)    -1.490478            -2.209791            -8.036153            -8.296821

                                                   CANONICAL DISCRIMINANT FUNCTIONS

                            PERCENT OF   CUMULATIVE   CANONICAL  :  AFTER
FUNCTION     EIGENVALUE      VARIANCE     PERCENT    CORRELATION :  FUNCTION   WILKS' LAMBDA   CHI-SQUARED     D.F.    SIGNIFICANCE

                                                                 :     0        0.1020836        38.793          6        0.0000
   1*          2.82179        64.35         64.35     0.8392685  :     1        0.3901495        16.001          2        0.0003
   2*          1.56312        35.65        100.00     0.7809292  :

   * MARKS THE 2 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

             FUNCTION 1          FUNCTION 2

ALK          -0.38823             1.08641
TURB          1.13540            -0.20569
```

```
30-SEP-86      DATA VERIFICATION
13:22:34       VACH    ACAR3                                      DEC VAX-8600   VMS V4.4

STRUCTURE MATRIX:

POOLED WITHIN-GROUPS CORRELATIONS BETWEEN DISCRIMINATING VARIABLES
                                     AND CANONICAL DISCRIMINANT FUNCTIONS
(VARIABLES ORDERED BY SIZE OF CORRELATION WITHIN FUNCTION)

             FUNCTION 1          FUNCTION 2

TURB          0.94170*            0.33645
PH           -0.21537*            0.04624

ALK           0.17826             0.98398*
TEMP         -0.24149            -0.53455*
DO           -0.24314            -0.44368*
HARD          0.20921             0.32124*
COND         -0.13960             0.20159*

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

                   FUNCTION 1               FUNCTION 2

ALK             -0.3129421E-02           0.8738950E-02
TURB             0.9932624E-01          -0.1799416E-01
(CONSTANT)      -0.6327560              -2.073417

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

  GROUP           FUNCTION 1               FUNCTION 2

    1              -0.73509                -1.62875
    2              -0.96141                -0.83206
    3              -1.05526                 1.54850
    4               2.38442                 0.09833
```

Table G-2. Computer printout of stepwise discriminant analysis of contaminant variables by treatment.

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACH   ACAD3                                      DEC VAX-8600   VMS V4.4

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP  1,  ALI     WAS INCLUDED IN THE ANALYSIS.

                                 DEGREES OF FREEDOM            SIGNIF.        BETWEEN GROUPS

WILKS' LAMBDA            0.46198   1    3         17.0
EQUIVALENT F             6.59949        3         17.0               0.0037

-----------------VARIABLES IN THE ANALYSIS AFTER STEP 1 ------------------------------

VARIABLE      TOLERANCE        F TO REMOVE     WILKS'LAMBDA

ALI           1.0000000          6.3995

-----------------VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 --------------------------

                              MINIMUM
VARIABLE      TOLERANCE       TOLERANCE            F TO ENTER          WILKS' LAMBDA

PB            0.9833782       0.9833782            0.35097             0.43284
CU            0.9298435       0.9298435            1.0719              0.38467
ZN            0.9144201       0.9144201            2.6798              0.30748
CD            0.8163661       0.8163661            1.7491              0.34798
CR            0.8441411       0.8441411            3.4779              0.27963
AS            0.9929868       0.9929868            3.0579              0.29356
NI            0.9946464       0.9946464            0.42218             0.42809
AL            0.9860236       0.9860236            0.87296             0.39700
BA            0.9967322       0.9967322            0.98682             0.38984
ARO           0.4085402       0.4085402            0.15897E-01         0.46060

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 1
EACH F STATISTIC HAS 1 AND 17.0 DEGREES OF FREEDOM.

               GROUP       1                          2                          3
   GROUP
      2               0.98196E-03
                      0.9754

      3               0.46895E-03               0.14059E-03
                      0.9830                    0.9907

      4               9.1104                   13.951                     13.862
                      0.0077                    0.0016                     0.0017

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.
```

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACU   ACAD3                                  DEC VAX-8800   VMS V4.4

                                         SUMMARY TABLE

          ACTION          VARS     WILKS'
STEP ENTERED REMOVED       IN      LAMBDA         SIG.      LABEL

  1 ALI                    1       .46198         .0037

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

TRT     =          1                  2                  3                  4

ALI           0.1713519E-03      0.5160028E-04      0.8859671E-04      0.1170596E-01
(CONSTANT)   -1.306797          -1.306340          -1.306429          -3.732072
                                                          CANONICAL DISCRIMINANT FUNCTIONS


                           PERCENT OF   CUMULATIVE   CANONICAL   :  AFTER
FUNCTION     EIGENVALUE     VARIANCE     PERCENT     CORRELATION : FUNCTION  WILKS' LAMBDA  CHI-SQUARED    D.F.    SIGNIFICANCE

                                                                 :   0     0.4619757        13.514         3        0.0036
    1*         1.16462      100.00       100.00      0.7335014   :

    * MARKS THE 1 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

              FUNCTION 1

ALI            1.00000
```

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACN   ACAD3
                                                          DEC VAX-8800   VMS V4.4

                                                     ALL-GROUPS STACKED HISTOGRAM

                                                     CANONICAL DISCRIMINANT FUNCTION 1

          20+                                                                               +
            I                                                                               I
            I                                    4                                          I
F           I                                    4                                          I
R         15+                                    3                                          +
E           I                                    3                                          I
Q           I                                    3                                          I
U           I                                    3                                          I
E         10+                                    3                                          +
N           I                                    2                                          I
C           I                                    2                                          I
Y           I                                    2                                          I
           5+                                    2                                          +
            I                                    2                                          I
            I                                    1                                          I
            I                                    1       4         444                      I
            X---------+---------+---------+---------+---------+---------+---------+---------X
           OUT      -6.0      -4.0      -2.0       .0        2.0       4.0       6.0        OUT
  CLASS      222222222222222222222222222222222222111114444444444444444444444444444444444444444
CENTROIDS                                        31        4

CLASSIFICATION RESULTS -

                        NO. OF     PREDICTED GROUP MEMBERSHIP
   ACTUAL GROUP         CASES          1           2           3           4
 ----------------     --------    ----------  ----------  ----------  ----------
 GROUP       1             3           2           0           1           0
                                     66.7%        0.0%       33.3%        0.0%
 GROUP       2             6           0           4           2           0
                                      0.0%       66.7%       33.3%        0.0%
 GROUP       3             6           1           2           3           0
                                     16.7%       33.3%       50.0%        0.0%
 GROUP       4             6           2           0           0           4
                                     33.3%        0.0%        0.0%       66.7%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED:  61.90%
```

Table G-3. Computer printout of stepwise discriminant analysis of biological variables by treatment.

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACH   ACAB3                                   DEC VAX-8800   VMS V4.6

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP  1, TOTAX   WAS INCLUDED IN THE ANALYSIS.

                                   DEGREES OF FREEDOM            SIGNIF.        BETWEEN GROUPS

WILKS' LAMBDA            0.09518   1    3          17.0
EQUIVALENT F            53.8683         3          17.0             0.0000

------------------VARIABLES IN THE ANALYSIS AFTER STEP 1 --------------------------------

VARIABLE       TOLERANCE        F TO REMOVE      WILKS'LAMBDA

TOTAX          1.0000000          53.868

------------------VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 ---------------------------

                                MINIMUM
VARIABLE       TOLERANCE        TOLERANCE             F TO ENTER           WILKS' LAMBDA

DIV            0.9880858        0.9880858             1.2449               0.07717
TOTORG         0.9999995        0.9999995             0.63965              0.08499
TOTCRUS        0.9999427        0.9999427             0.67765              0.08445
DIP            0.9913941        0.9913941             6.5438               0.04274
INS            0.8569322        0.8569322             1.7978               0.07119

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 1
EACH F STATISTIC HAS 1 AND 17.0 DEGREES OF FREEDOM.

                GROUP        1                          2                          3

  GROUP

     2                 17.978
                        0.0006

     3                 66.274                     22.825
                        0.0000                     0.0002

     4                133.01                      79.779                     17.259
                        0.0000                     0.0000                     0.0007
```

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACN   ACAD3                                    DEC VAX-8800   VMS V4.4
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

AT STEP  2, DIP   WAS INCLUDED IN THE ANALYSIS.
                                   DEGREES OF FREEDOM          SIGNIF.        BETWEEN GROUPS

WILKS' LAMBDA            0.04274   2    3        17.0
EQUIVALENT F            20.4641         6        32.0          0.0000
-------------------VARIABLES IN THE ANALYSIS AFTER STEP 2 ------------------------------------

VARIABLE       TOLERANCE       F TO REMOVE      WILKS'LAMBDA

TOTAX          0.9913941         48.579          0.43205
DIP            0.9913941          6.5438         0.09518
-------------------VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 --------------------------------

                                MINIMUM
VARIABLE       TOLERANCE       TOLERANCE           F TO ENTER          WILKS' LAMBDA

DIV            0.8763738       0.8763738           1.1289              0.03487
TOTORG         0.9558248       0.9558248           0.85545             0.03650
TOTCRUS        0.9585286       0.9585286           0.87795             0.03636
INS            0.7984782       0.7984782           1.9169              0.03090

F STATISTICS AND SIGNIFICANCES BETWEEN PAIRS OF GROUPS AFTER STEP 2
EACH F STATISTIC HAS 2 AND 16.0 DEGREES OF FREEDOM.

               GROUP        1                      2                      3

   GROUP

      2                 8.8229
                        0.0026

      3                33.430                 17.353
                        0.0000                 0.0001

      4                63.263                 37.614                 16.170
                        0.0000                 0.0000                 0.0001

F LEVEL OR TOLERANCE OR VIN INSUFFICIENT FOR FURTHER COMPUTATION.
```

```
30-SEP-86     DATA VERIFICATION
13:22:34      VACN   ACAB3                              DEC VAX-8600   VMS V4.4

                                   SUMMARY TABLE

        ACTION          VARS      WILKS'
STEP ENTERED REMOVED     IN       LAMBDA         SIG.      LABEL

  1 TOTAX                1        .09018         .0000
  2 DIP                  2        .04274         .0000

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

TRT      =        1                  2                  3                  4

TOTAX          3.811417           3.695672           1.365818           0.0000000E+00
DIP            0.4314478E-01      0.1195379E-01      0.1276475          0.0000000E+00
(CONSTANT) -34.99483          -14.70782          -7.113206          -1.386294

                                                   CANONICAL DISCRIMINANT FUNCTIONS

                        PERCENT OF   CUMULATIVE    CANONICAL  :  AFTER
FUNCTION    EIGENVALUE   VARIANCE      PERCENT    CORRELATION : FUNCTION  WILKS' LAMBDA  CHI-SQUARED    D.F.   SIGNIFICANCE

                                                              :   0      0.0427409       33.394         6        0.0000
    1*        9.50703     88.57         88.57      0.9512232  :   1      0.4490797       13.609         2        0.0011
    2*        1.22678     11.43        100.00      0.7422400  :

  * MARKS THE 2 CANONICAL DISCRIMINANT FUNCTIONS REMAINING IN THE ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

            FUNCTION 1          FUNCTION 2

TOTAX        0.99899            -0.18841
DIP          0.01089             1.00426
```

Titles and Legends

Figure 1. Prudhoe Bay, Alaska with general location denoted on insert.

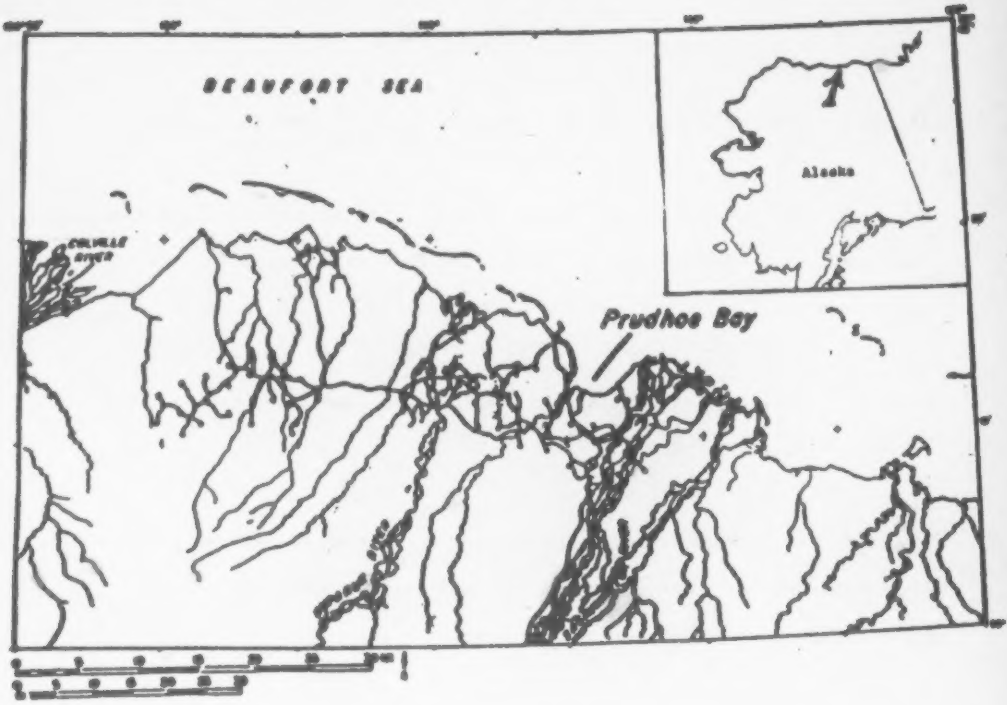
Figure 2. Map of Prudhoe Bay region showing drill pads, roads, and sampling locations. ARCO drill sites 6, 16, and 18, SAPC drill sites (= pads) A, E, and N, and control ponds 1, 2, and 3 were sampled.

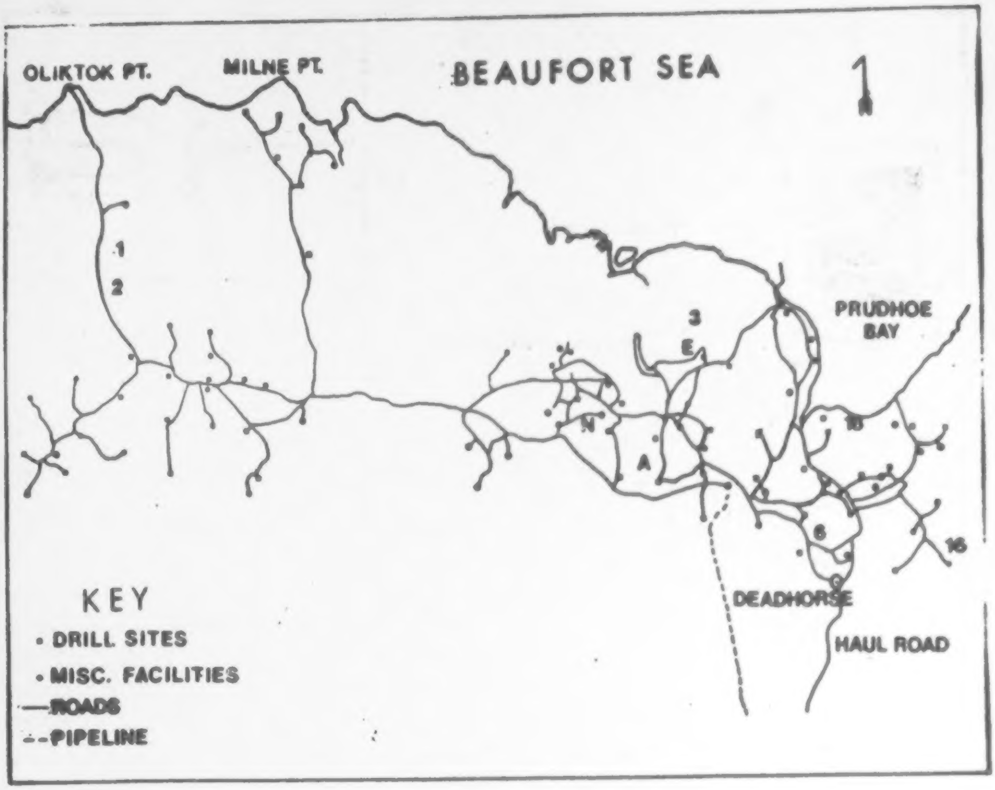
Figure 3. Schematic of generalized sampling area and sweep net sampling technique (insert).

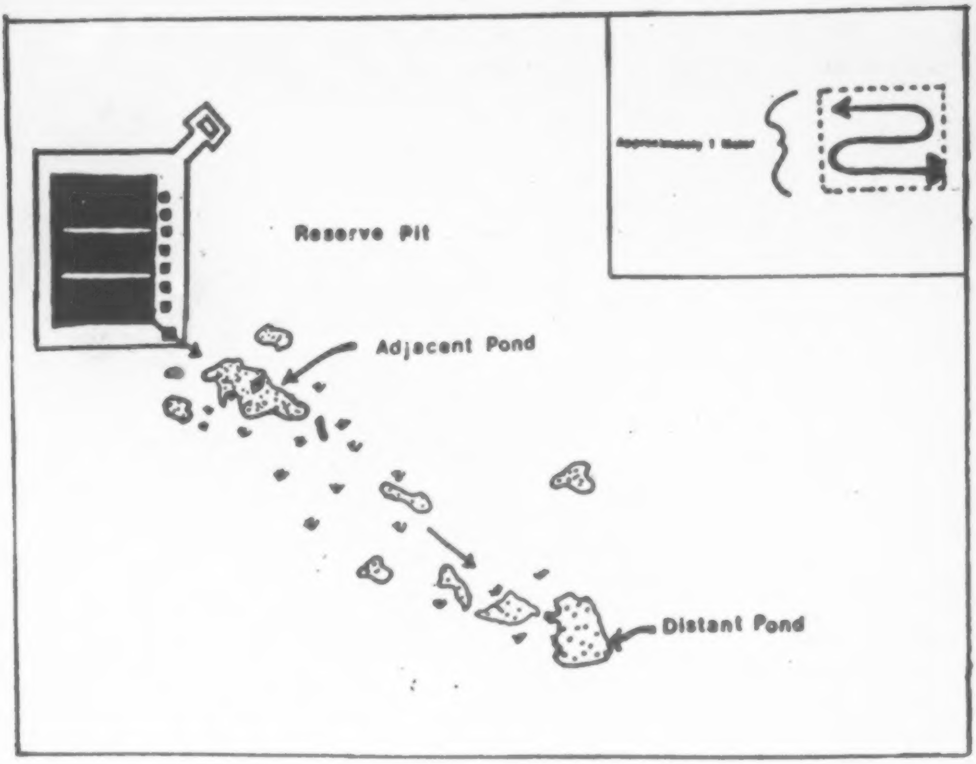
Figure 4. Scatterplot showing the maximal separation of reserve pits (4), receiving ponds (3), distant ponds (2), and control ponds (1) based on discriminant analysis of water quality characteristics.

Figure 5. Histogram showing the maximal separation of reserve pits (4), receiving ponds (3), distant ponds (2), and control ponds (1) based on discriminant analysis of contaminant variables (aliphatic hydrocarbons, arsenic, and aluminum). Only aliphatic hydrocarbons entered the model.

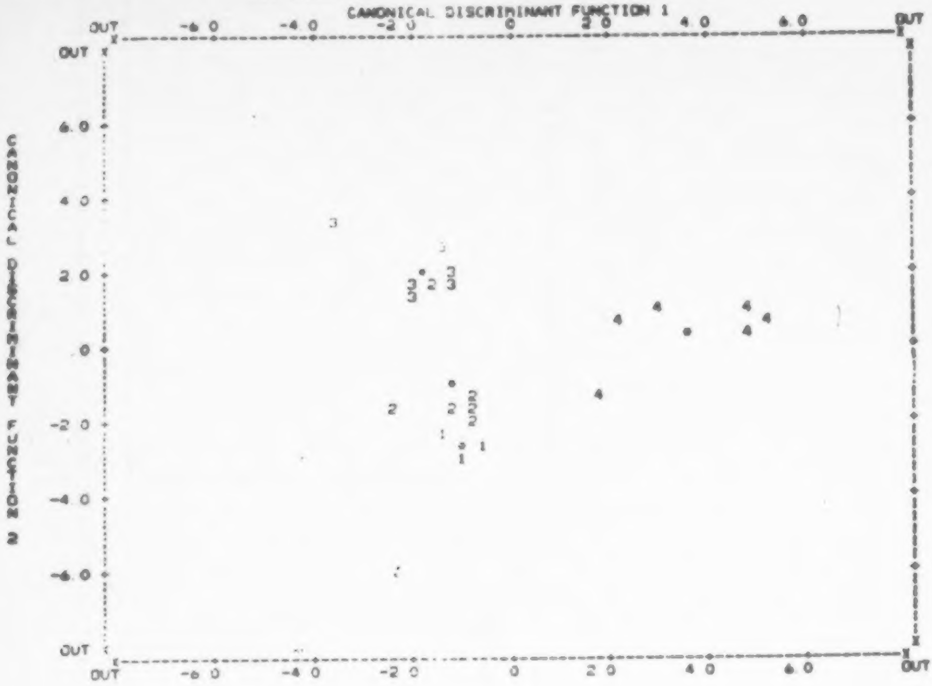
Figure 6. Scatterplot showing the maximal separation of reserve pits (4), receiving ponds (3), distant ponds (2), and control ponds (1) based on discriminant analysis of biological variables.


BEAUFORT SEA
COLVILLE RIVER
Prudhoe Bay
Alaska


OLIKTOK PT.
MILNE PT.
BEAUFORT SEA
1
2
3
E
N
A
PRUDHOE BAY
15
6
16
DEADHORSE
HAUL ROAD
KEY
• DRILL SITES
• MISC. FACILITIES
—ROADS
- - PIPELINE


Approximately 1 Meter
Reserve Pit
Adjacent Pond
Distant Pond

```
15-SEP-86   DATA VERIFICATION
08:39:53    UACN ACAD3
                                          DEC VAX-8800   VMS V4.4
                         ALL-GROUPS SCATTERPLOT - * INDICATES A GROUP CENTROID
```



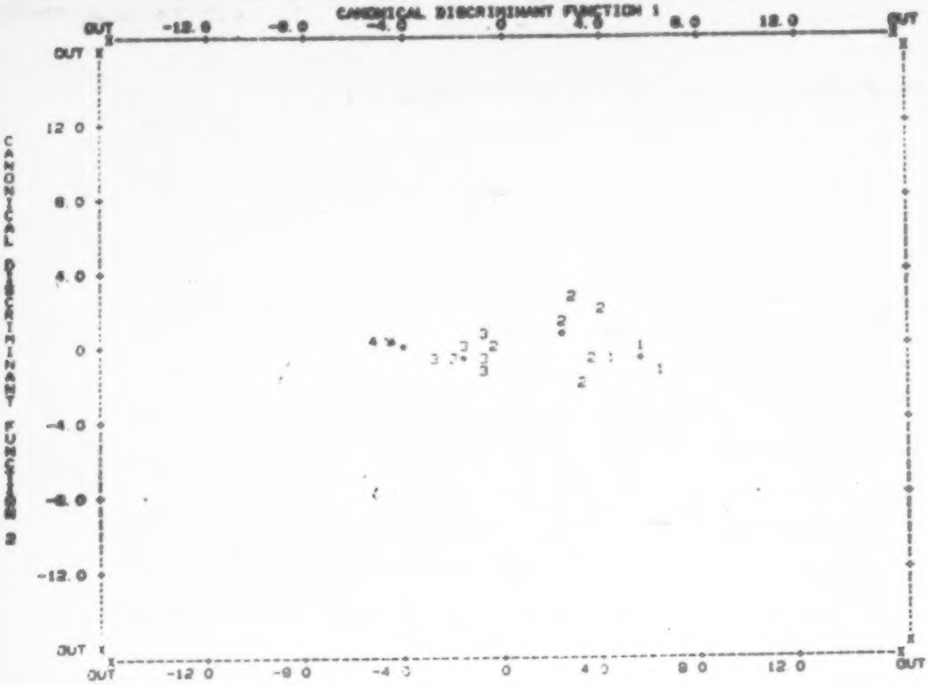
```
 30-SEP-86    DATA VERIFICATION
 13:22:34     VACN   ACAD3                                  DEC VAX-8800  VMS V4.4

                                                  ALL-GROUPS STACKED HISTOGRAM

                                                 CANONICAL DISCRIMINANT FUNCTION 1

          20+                                                                               +
            :                                                                               :
            :                                     4                                         :
 F          :                                     4                                         :
 R        15+                                     3                                         +
 E          :                                     3                                         :
 Q          :                                     3                                         :
 U          :                                     3                                         :
 E        10+                                     3                                         +
 N          :                                     2                                         :
 C          :                                     2                                         :
 Y          :                                     2                                         :
           5+                                     2                                         +
            :                                     2                                         :
            :                                     1                                         :
            :                                     1       4         444                     :
             X---------+---------+---------+---------+---------+---------+---------+---------X
           OUT      -6.0      -4.0      -2.0        .0       2.0       4.0       6.0        OUT
    CLASS    22222222222222222222222222222222222222111114444444444444444444444444444444444444444
 CENTROIDS                                        31         4
```

```
[illegible]   DATA VERIFICATION
[illegible]   UACN ACAD3
                                  DEC VAX-8800   VMS V4.4
                 ALL-GROUPS SCATTERPLOT - * INDICATES A GROUP CENTROID
```



STATE OF ALASKA

STEVE COWPER, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION
OFFICE OF THE COMMISSIONER
P.O. BOX O, JUNEAU, ALASKA 99811-1000

TELEPHONE
(907) 465-2600

January 26, 1988

The Honorable J. Bennett Johnston
Chairman
Committee on Energy and Natural Resources
United States Senate
Room 360, Dirksen Senate Office Bldg.
Washington, DC 20510

Dear Mr. Chairman:

I wrote you on December 10, 1987, concerning air pollution at the Alyeska Pipeline Terminal and other pipeline facilities. Apparently some concern was raised over my statement that some vapor recovery systems have not been dismantled. To avoid any confusion, additional clarification follows.

We do know that the original system at Pump Station 1 was discontinued in 1977 and was replaced by a flare system in 1987.

The situation at the Valdez terminal is more complicated and will take additional time for a thorough examination. From outward appearances, the three thermal oxidizers currently used to incinerate volatile organic compounds (VOCs) are the original units constructed in 1977. We have not yet been able to determine if any of the internal components of these units have been removed or significantly changed from the original design; however, Alyeska has acknowledged that they presently cannot operate at original design loads. We also understand that the auxiliary fuel use has been significantly reduced and that refractory damage has led to substantial system downtime for repairs. The handling capability of these units for new higher VOC levels due to additional natural gas liquids in the crude oil is currently part of our investigation and a major concern. Clarifications to this question have been requested from Alyeska and a response is expected by February 2, 1988.

Although we believe our previous statement to be correct, specifically, that the Valdez vapor recovery system has not been dismantled, we do recognize that changes may have occurred. An in-depth facility inspection of the Valdez terminal by state and EPA engineers is scheduled for the first half of March. I hope this clarification adequately addresses any concerns raised.

Sincerely,

Dennis D. Kelso
Commissioner

○